

# Midwest Engineer



WHAT INDUSTRY IS DOING ABOUT AIR POLLUTION—PAGE THREE

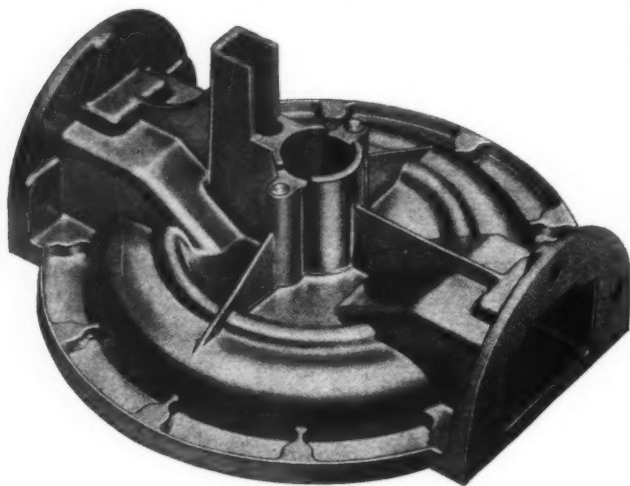
FEBRUARY, 1957

No. 9

# NPC Die Castings

ALUMINUM • ZINC • MAGNESIUM

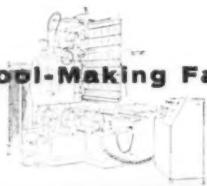
Excellent performance  
in virtually all industries



New Products Corporation produces intricate die castings with skill and precision for industries in all product lines.

NPC characteristics of Integrity, Quality and Service are characteristics which result from the vigorous, integrated teamwork of skilled personnel.

Excellent Tool-Making Facilities



## NEW PRODUCTS CORPORATION

P.O. BOX 666 • BENTON HARBOR 1, MICHIGAN



HIGH FIDELITY  
PHONOGRAPHS



CAMERAS



ELECTRONICS



HOME  
APPLIANCES



OFFICE  
EQUIPMENT



HAND TOOLS



INSTRUMENTS



AIRCRAFT



Founded 1922







MIDWEST ENGINEER  
Published Monthly  
BY  
THE WESTERN  
SOCIETY OF ENGINEERS  
AT  
84 EAST RANDOLPH STREET  
CHICAGO 1, ILLINOIS

George L. Jackson.....President  
Ormas G. Smith.....1st Vice-President  
William R. Marston.....2nd Vice-President  
Hjalmar W. Johnson.....Treasurer  
J. Earl Harrington.....Executive Secretary

*Trustees:*

Robert H. Bacon Charles L. Mee  
John P. Gnaedinger Charles F. Murphy  
Virgil E. Gunlock J. T. Rettaliata  
Arthur R. Harris Ernie A. Schmidt  
Ernest R. Hendrickson Frank V. Smith  
Joseph Kucho Dick Van Gorp

John F. Sullivan, Jr.....Past President  
Albert P. Boysen.....Past President  
James R. McKenney.....Chairman, Publications  
Committee

J. EARL HARRINGTON  
*Editor and Business Manager*

HAROLD K. EATON  
*Managing Editor*

GENERAL AND EDITORIAL OFFICES  
HEADQUARTERS OF  
WESTERN SOCIETY OF ENGINEERS  
84 E. RANDOLPH STREET  
CHICAGO 1, ILLINOIS  
TELEPHONE: RA NDOLPH 6-1736

The Society does not assume responsibility for statements and opinions in articles, papers and discussions appearing herein. All material must be submitted on or before the 10th of the month prior to date of publication.

Copyright 1957 by the  
WESTERN SOCIETY OF  
ENGINEERS

Permission is given for the reproduction of any material herein, provided due credit is given.

Single Copy .....\$ .50  
Annual subscription ..... 4.00  
Foreign subscription ..... 6.00

Entered as second-class matter at the post office at Chicago, Illinois under the Act of March 3, 1879.

# Midwest Engineer

A Publication of the

WESTERN SOCIETY OF ENGINEERS

*Serving the Engineering Profession*



February, 1957

Vol. 9, No. 9

## CONTENTS

What Industry is doing about Air Pollution .....	3
Professional Directory .....	22
ESPS Listings .....	24
Book Reviews .....	26
News of Engineers .....	28
Applications .....	30
Advertisers' Index .....	31

## COVER STORY

Chicago—our city—is a city of many moods. Sometimes she is smiling and glad as after a gentle rain when the sun breaks through again. Sometimes she is sullen and sad, as on an afternoon when ominous clouds make her dark as doom. Sometimes she is gay—she appears to conventioners this way. Sometimes she stands with a slight disguise, and we seem to see her with shining, expectant eyes. Each way we see her we see her right. We see her now as "Chicago on a Stormy Night."

—Cover photograph by Orville Andrews—Cook Electric Company, Chicago



## *Join Your Friends* and business associates.

- *Dine with the family*
- *Luncheon- 11:30 a.m. - 2 p.m.*
- *Lunch leisurely*
- *Dinner- 5:30 p.m. - 8 p.m.*
- *Relax in the lounge*
- *Use the lounge and dining room for your parties*

For reservations, call RAndolph 6-1736.

**Western Society of Engineers**

84 East Randolph Street

## What Industry Is Doing about

# Air Pollution

By Edward C. Logelin

Standing before you today, I feel almost as if I am appearing under false pretenses. I can lay no claim to being an authority on any of the countless number of devices used in industry to make the air that we breathe cleaner and more healthful for all of us. Nor can I, by the furthest possible stretch of the imagination, be considered an expert on the causes or cure of air pollution.

I would feel more badly about this if I hadn't recently become acquainted with the derivation of the word "expert." Break it into syllables and you find that ex-stands for "formerly, used to be, or colloquially, 'has been'." And spurt, as you know, is a drip with pressure behind it.

Possibly, then, it isn't too bad to have one speaker on your program who is not a technical expert on the subject. He, of course, has the great advantage of speaking from a different point of view—of interpreting the subject from a new perspective.

### What is Industry Doing . . . ?

That, of course, forces one to be primarily a reporter attempting to discuss objectively "what industry is doing about air pollution." That was the title assigned to me today, and that is my job as I see it—one of reporting as objectively as possible why industry is interested in the subject, some of the deterrents to industry's efforts, and some of the many constructive steps that are being taken.

I don't think there is any need to labor the point of whether or not midwestern manufacturers are interested in the subject. They have proved this interest in many ways: by their membership in

MAPPA, by their quick response when the Chicago Association of Commerce and Industry set up a committee. More recently, when Kenneth Wiener, chairman of Mayor (of Chicago) Daley's Air Pollution Committee, called for attendance at a meeting to discuss this subject, industry members were quick to take up the invitation to the organization meeting.

### Civic Responsibility

Why are they interested? Well, after all, industry is made up of people—employees wearing blue shirts or white, or working on production lines, behind benches or desks. As residents of the community, they cannot help but be interested in cleaner air, more healthful surroundings for themselves and their families, particularly their children.

In fact, it seems to me that very often those in managerial positions are more conscious of this responsibility as corporate citizens than they are as individual residents of the community. For quick proof, compare the operating efficiency of fleet operation cars with personally operated cars.

Or, take an executive who insists that his engineers maintain both equipment and operating practices at peak efficiency, and who would consider black smoke pouring from his plant's chimney as an indication of inefficient methods. How often he can be found any Saturday afternoon in the Fall out on his front lawn busily sending up smoke signals—gaily creating his own private smudge producing fire. Talk about inefficient combustion—every time a single bright red clean flame licks its way to the surface and gathers strength, he promptly dumps another bushel or more of slightly soggy leaves on top of it. Meanwhile eyes grow red-rimmed, curtains pick up

soot, and motorists wonder why their cars are covered with a smudgy film in such a nice clean residential neighborhood. I know. Up till last year I was one of the Saturday afternoon firemen. Then I bought a mulcher. Now its shiny steel blades pulverize the leaves, thus cutting down on air pollution, improving my lawn, and giving me more time to watch football either at a stadium or on television.

While we're talking about leaf burning, we might as well mention that other air polluting villain—the back yard incinerator. Here again, the firing practices are far from ideal. In fact, the users usually seem to be trying to disprove that old adage that "where there's smoke, there's fire." The single incinerator in your back yard or mine may not seem to be much of a menace to cleaner air. Multiply them by thousands, however, and toss in smoldering bonfires of garden and other refuse, and you have quite a problem in air pollution—one which, in fact, makes industrial air pollution control simple by comparison.

### Economic Interest

Industry has an economic interest, too, in addition to its sense of civic responsibility—one aptly illustrated by a slogan coined in Chicago many years ago. It stems from the packing industry where it was said they "use everything but the squeal," but of course the principle applies to all industry. If particulate or gaseous matter is charged into the atmosphere, the good manager asks himself, "Is there some way we can use this material? Can it be utilized to make a better product for our customer or to create additional revenue to be shared by our workers and our stockholders?"

There is another economic aspect. Industry is desirous of improving work-

Mr. Logelin, vice-president, United States Steel Corp., presented this address before a luncheon meeting of the Air Pollution Conference on December 14, 1956, in Chicago.

# VU Boilers exceed performance guarantees

at  
Central Fibre  
Products Co.



Firing aisle at the Central Fibre Products Mill Division plant at Quincy, Ill. This is a front end view of two C-E Traveling Grate Stokers which fire the VU Boilers as shown by the cross-sectional elevation drawing.

**COMBUSTION  
ENGINEERING** 

Combustion Engineering Building  
200 Madison Avenue, New York 16, N. Y.

Canada:  
Combustion Engineering-Superheater Ltd.

all types of steam generating, fuel burning and related equipment; nuclear reactors; paper mill equipment; pulverizers; flash drying systems; pressure vessels; soil pipe.

B-9678

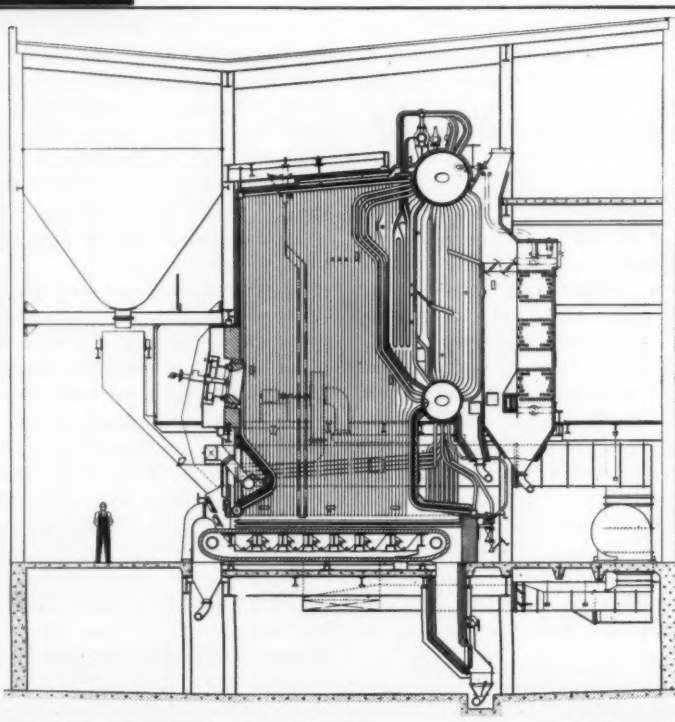
The two C-E Vertical Unit Boilers installed in this plant have exceeded their guaranteed efficiency of 82.6% and guaranteed peak capacity of 100,000 lb steam per hr. These stoker-fired units are equipped with a C-E overfire air system that *works to perfection* by completely burning out all combustibles at the proper point, allowing for a *very clean furnace*. There is *absolutely no smoke* from the stacks. Furthermore, the draft loss of each unit — as well as the flue gas temperature leaving the economizer — is lower than the customer expected.

The above comments are all contained in a report written by the H. M. Wilson Company, Inc., Consulting Engineers to the Central Fibre Products Company, of Quincy, Illinois. Of course, it won't hurt to get the opinion of the customer, too, if you're interested. They will be very happy to discuss their boiler installation with you.

Incidentally, when you need boilers, consider the fact that Combustion has a complete line of steam generating and fuel burning equipment suitable for any pressure, temperature and fuel requirement.

**Below:** Cross-sectional elevation of the C-E Vertical Unit Boiler, Type VU-50X, installed in the Mill Division Plant of the Central Fibre Products Company, Quincy, Illinois. There are two units, each fired with a C-E Traveling Grate Stoker and designed for the future use of oil or gas as alternate fuels.

Present operating conditions are 185 psi and 450 F. Each unit has a maximum continuous capacity of 85,000 lb per hr and a four hour peak of 100,000 lb per hr. The boilers are designed for 650 psig and in the future will operate at 610 psig and 650 F.





ing conditions in the interest of good industrial relations and better quality product.

### "We Can't Afford . . ."

The top official of a utility company put it this way in a recent conversation. "We can't afford inefficient combustion. Good practices are not only a civic duty—they're a commercial necessity."

There is an apt illustration of this too in the Chicago area, in the development of the great coal chemical plants of the steel industry, which historically began with the construction of the first by-product coke ovens in this nation, at Joliet, Illinois in 1908. Before the coming of these by-product ovens and the modern coal chemical plant, the old beehive ovens discharged a great deal of smoke and gaseous matter into the air. Today the coal chemicals are recovered, refined and used in thousands of ways to make products ranging from aspirin to phonograph records, from nylon stockings to wonder drugs.

Yes, industry is interested in the subject because its managers are residents

desirous of improving it as a place to live, and also because, economically, the pollutants discharged into the air often represent a definite waste of possibly valuable materials, or inefficiency in combustion methods.

But industry does face some deterrents in doing something about air pollution. Time permits me to name only a couple.

First of all, is the fact that much of the polluting matter is not generated by industry.

Reading reports from time to time from MAPPA, Armour Research Foundation, and municipal bureaus interested in cleaner air, we are impressed by the fact that so much of the dustfall comes under these categories. I have a friend who was very active in a clean-up campaign one year who insists that he read a report on dustfall which listed the percentage of butterflies' wings and grasshoppers' legs which were found in dustfall collections.

It has been estimated that only about 10 per cent of the dustfall in a city like Chicago can be traced to industry, the

remaining 90 per cent being spread over such sources as traffic, open fires, wind-blown dust from the farms and prairies of the Middlewest, rubbish thrown in the streets, improper fuel and faulty combustion of home heating plants.

Certainly as Mr. Plimpton pointed out in this morning's session, the dustfall increases tremendously during the winter months. Again, as he pointed out, there is no significant change in the volume of industrial operations during those months, the big difference being home heating equipment.

Here is a very serious problem in any effort industry may make for cleaner air. Unless there is a concerted program on the part of all concerned—the householder, the municipality, the public institutions—industry will find that its expense and effort to prevent air pollution go for naught. This is the same situation which has obtained for many years in the field of stream pollution. Industry, by comparison to the wastes of households, municipalities, and others, is only a small factor in the problem, and cannot, by its own effort, no



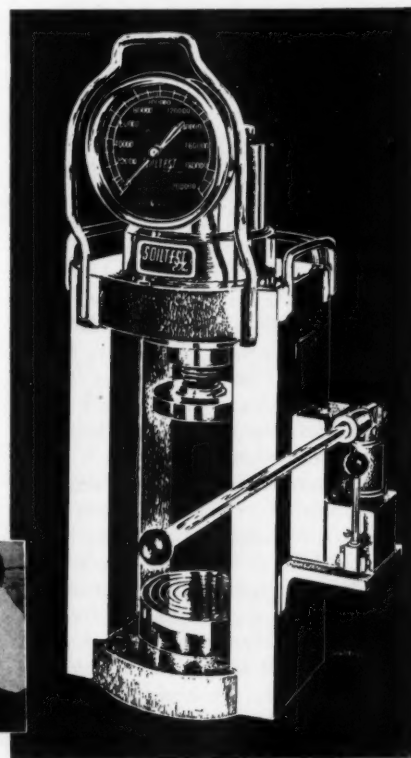
## CONCRETE TESTING AT THE JOB SITE

Where roads, bridges or buildings are under construction, the new, portable CT-711 CONCRETE TESTER is an invaluable aid in saving time, money and materials . . . by bringing laboratory testing precision to all working locations.

CUBES • CYLINDERS • BEAMS  
CAPACITY TO 200,000 POUNDS



**SOILTEST**  
Incorporated



WRITE TODAY FOR OUR NEW CATALOG

4711 WEST NORTH AVENUE • CHICAGO 39, ILLINOIS



matter how expensive, accomplish much in the direction of a general clean-up.

I am sure, for example, that the detergent froth which piles up like snow near the dam in the river that runs through my town is not created by industrial waste. Nor does it, I am reasonably sure, come from any large commercial laundry. I am certain that somehow it is added to the flowing waters of the river by thousands of housewives. Each of them firmly believes that cleanliness is next to godliness and each uses plenty of detergents and water in that belief. Somehow the discharge is going back to the river.

### Cooperation

I mentioned the expense of the effort. This too is sometimes a deterring factor to industry's participation in the search for cleaner air. It need not be if the program is set up properly. That is why it seems to me the greatest progress is made in those cities, counties or other governmental units, where the civic fathers call upon industry to help them in planning ways and means of policing their own industries.

This is the type of program that gets cooperation, that utilizes the best brains of each individual industry. For the managers of industry, acutely aware of the problems, are working on them constantly through research, through mechanical and electronic devices, through improved operating practices.

As new plants and machinery come into being, each of them incorporates the latest developments—some proved, and some still experimental. And, when an industry's engineers are starting from scratch to build a new plant, it is far different from plants built five, ten, fifteen or more years ago—just as each of those consecutively was a little better than the previous ones.

But it is wholly impractical to think only in terms of new plants. Existing facilities, representing as they do, investment of billions of dollars in plants and equipment, are necessary to the economy of the city, the state, and the nation. That they represent a tremendous investment is well known. In the steel industry, for example, one of the newest plants represents an investment of \$65,000 in plant and equipment behind each employee's job.

Existing facilities must be taken into consideration in any program—they ex-

ist, they are desirable, and they cannot be replaced at one fell swoop.

### Primary Objective

Here is where expense becomes a factor. I know from personal experience that industry is spending large sums to install controls and other equipment, which will improve the performance of these older facilities, and reduce or eliminate metallurgical dust and fumes. Every time we line or rebuild a blast furnace, for example, we add new controls and other devices to reduce the discharge. Such expenditures are considered part of our company's responsibility as a neighbor and citizen. There is, however, justified resistance to expenditures for unproved equipment, mechanical or electronic devices which may not be suitable or effective in older plants. In other words, industry believes that the primary objective should be the reduction of air pollution, rather than rigid specification of means to achieve that objective.

The successful and effective air pollution control program recognizes this objective. It is drawn up and enforced to apply to the community's industrial operations as they exist. It is not planned with a Utopian concept such as might obtain if you are starting from scratch to build a new industrial community.

The city which asks industry to set up advisory committees to aid in draft-

ing air pollution ordinances, gets the benefit of the experience of the men who know the plants and problems best. Moreover, it gets an ordinance suitable to local conditions, for after all no two cities are the same either in meteorological conditions, direction of prevailing winds, kinds of industry or balance between industrial, commercial, and residential land use. What is an excellent provision in Detroit may not be applicable in Los Angeles and both, of course, will differ from conditions in Chicago. Thus we must look to local men and local experience in developing our own program.

### Standards

When called upon to cooperate in this fashion, industry has always done so. And I might add that the work of practical men working first to set up standards for their industry, and then to police the industry to make sure that the standards are observed, probably will prove to be much more effective in cutting and eliminating causes of air pollution than the rigid enforcement of any arbitrary set of standards based on today's knowledge and testing methods.

Those of us who are not technically trained in this field, often think of such rigid standards as representing a well defined scientific basis for achieving the community's cleaner air objectives. And

(Continued on Page 18)



*The Original*

• NON PRESSURE FULL LENGTH TREATED POLE •

**VALENTINE CLARK CORPORATION**

ST. PAUL 8, MINN.

# Prize Paper Rules Liberalized

To encourage Society members to write good engineering papers, and to obtain a broader base for the Prize Paper Contest, the Prize Awards Committee has liberalized the Rules Governing the Competition in W.S.E. Prize Paper Contest for 1957.

Under the new rules any member of the Society is eligible to compete and his paper may serve other purposes also. After the contest is completed he may present his paper at a meeting of the Society or publish it in any reputable magazine such as a technical society journal or trade publication, although the Society reserves the right to publish prize-winning papers first.

A maximum of five prizes totalling as much as \$500.00 may be awarded if this is justified by the number and quality of the papers submitted. Minimum value of first prize will be \$100.00.

Copies of the Rules and of a Statement of Minimum Requirements for acceptance of papers may be obtained from the Secretary of the Society. To be eligible for prizes, papers must be submitted by April 1 and prizes will be awarded at the Annual Meeting in June.

The new rules are as follows:

—1. Any member of the Society may compete regardless of grade of membership. The younger members are par-

ticularly urged to enter the contest.

—2. The paper should present an engineering subject, or one related thereto, of interest to a large group of engineers rather than a specialist alone.

—3. The paper submitted must not have been previously published in substantially the same form. No copyrighted material shall be included unless permission has been obtained and noted in the paper. References to previously published material should be noted, with appropriate credit indicated, and a bibliography of references used should be included.

—4. Each manuscript, with its drawings or other illustrations, becomes the property of the Society for the duration of the contest and may not be published or presented elsewhere until released by the Society. However, each prize winning paper will be released for use as desired by the author either after publication by the Society, or, if the Society does not elect to publish it, after the prize is awarded. All other papers will be released when the prize winning papers are publicly announced. There is no restriction on the presentation of the material at a meeting of the Society, after the prize winning selections have been announced.

—5. Papers which are accepted will be

judged on value to the engineering profession, originality of presentation, and editorial merit.

—6. Any member of the Society who wishes to submit a paper in this contest should contact the secretary as early as possible, not later than Mar. 1, 1957 and request a copy of the rules governing the competition and a statement of the minimum requirements for acceptance of papers. These cover in detail the procedure that should be followed in preparing and submitting papers for the contest.

—7. Papers must be submitted to the secretary by Apr. 1, 1957. Each paper will be identified by number only. The secretary of the Society is the only person who will maintain the key to the authors. If any paper as submitted does not comply with the minimum requirements, the secretary will so advise the author and discuss with him the points which do not meet the minimum requirements. The papers which are accepted will be forwarded to the Awards Committee for judging not later than May 1. Papers which have not met the minimum requirements by that time cannot be considered for prizes.

—8. If papers submitted are not of sufficient merit to warrant the award of any or all of the prizes, the Awards Committee reserves the right to award less than the announced number of prizes or to postpone the competition.

—8. The winners will be announced and the prizes presented at the annual meeting of the Society in June.

## Jim Rivera Speaks At Dinner Meeting

Jim Rivera, right-field ace of the perennial pennant hopefuls, the White Sox, warmed up at the January 9 Noon Luncheon and made a grand-slam home-run with all WSE members and guests attending. The colorful Mr. Rivera spoke "About Baseball" devoting the major portion of his appearance to a "no-holds-barred" question and answer period. (ie., Q: "What would you say is Yogi Berra's main weakness?" A.: "Well — he can't hit a ball in his sleep!")

Jim Rivera exemplifies all the good sense and good humor that a truly great sportsman, as he is, always does. He left even those WSE members who are dyed-in-the-wool National Leaguers convinced.

## NASH BROTHERS CONSTRUCTION CO., INC.

Engineering Contractors

1840 South Kilbourn Avenue

Chicago 23

# WSE's Gold Card Service

## Has Been Established to Help You

Here are Some of the Advantages:



1. You need carry less money.
2. You pay only once a month—by check if you wish.
3. You get a record backed up by WSE house checks.
  - a. For your expense account.
  - b. For your income tax, if applicable.
4. You eliminate the chance of being caught short when you must unexpectedly entertain business or other guests.
5. You gain prestige with those guests.
6. You pay no extra dues—merely maintain a minimum billing of \$10 per month. So why not fill in and mail the coupon below today, while you are thinking of it. You'll be glad you did.

A number of members have asked for this, a service which the Western Society is pleased to furnish.

CHAIRMAN, HOUSE COMMITTEE,  
WESTERN SOCIETY OF ENGINEERS,  
84 EAST RANDOLPH STREET, CHICAGO, ILLINOIS

Please send me a gold membership card that will permit me to sign for house checks at the bar and dining room. It is my understanding that the minimum billing for such an account will be \$10.00 a month. It is also my understanding that this arrangement will be on a till forbid basis and may be cancelled at the end of any calendar month on 30 days prior notice in writing.

NAME (PRINT) \_\_\_\_\_

ADDRESS \_\_\_\_\_

(SIGNATURE) \_\_\_\_\_

Add any special billing instructions here:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Highway Meet Set for March 4-6

Grant K. Borg, head of the Civil Engineering Department of Utah University, has announced in Salt Lake City that the Eighteenth Annual Highway Conference will be held in the new Union Building on the University of Utah Campus March 4, 5 and 6, 1957.

Following the established tradition of the Highway Conference, it will bring together all areas of highway interest. Particular emphasis will be placed on aspects of the National Highway Program. The general committee, headed by Preston D. Linford, has insured wide interest by programming speakers with local and nation-wide reputations both in public and service organizations who can furnish up-to-date information on every phase of the tremendous program to be assumed by the Western States.

The theme of the conference is "The New Federal Interstate Highway Program and its Effect Upon Highway Industries." The program follows out this theme and is intended to provide wide interest. The purpose of the conference is expected to be accomplished through the sharing of ideas and knowledge. Topics have been grouped, as far as possible, to accommodate those out-of-towners who cannot attend all three days.

The program for the first day is of general interest and intended to fill a growing need on the part of business, industry and technical people to get the latest information on what is likely to happen as the highway program gets underway. Speakers will have authoritative information on the overall picture as it pertains to government, our economy, and local political subdivisions. The Utah Motor Transport Association is in charge of the luncheon.

The second day's program is more technical in nature, intended to be of primary interest to contractors and engineers. The Intermountain Section of the Associated General Contractors is sponsoring this day's luncheon.

The third day's program combines various technical aspects and economics. It should prove to be of special interest to the many groups interested in traffic on city streets. The luncheon topic is devoted to safety aspects.

The traditional conference banquet will be held Tuesday night, March 5, and will be first to be held in the new Union Building.

This Eighteenth Highway Conference can easily be considered as having the greatest responsibility, by far, as it must provide a sounding board for the

newly enacted Federal Highway Program. The ramifications of this program are universally recognized as being but little understood by the best-informed people and those closest to the legislation. Recognizing the wide-spread interest, the Conference Committee has continued in effect the policy of throwing the conference wide open and inviting every interested person without a registration fee.

The General Committee invites inquiries and will make every endeavor to provide information as to the program, hotel reservations and items of general interest. Such inquiries should be directed to Prof. Grant K. Borg, Head, Civil Engineering Department, University of Utah, Salt Lake City, Utah.

## An Engineer Calls For Spartan Effort

A leading American engineer on Dec. 6 called for a Spartan educational program to meet the nation's technical manpower emergency.

Dr. Arthur Nutt, former president of the national Society of Automotive Engineers and currently vice-president, engineering, for aircraft engine-maker Avco Lycoming, spoke before an audience of University of Connecticut engineering students.

To speed up the quantity and improve the quality of engineers, Dr. Nutt suggested changes in primary school training including: shortened vacation periods, lengthened school day and week (to six days), earlier starting (at five years of age). The youth should have completed his primary and general college studies by the age of 20, he said.

The speaker had two proposals for improved college training, as well. He called for increased emphasis on English as basic to an engineer's success, recounting his frequent inability to understand engineering reports submitted to him because of the author's awkwardness. He urged that engineers be equipped to deal with the "emotions" as well as the principles of his profession. The engineer must be able to get along with others and "sort out both the facts and the emotions in a program in such a way that he sells his ideas to his boss, the management, the sales department, the customer."

BCEA ——— BCEA ——— BCEA ——— BCEA

## TO ENGINEERS

looking for qualified contractors



**BCEA\*** includes in its membership capable and responsible firms in all phases of the construction industry

**Write today**  
on your letterhead for free copies of "True Efficiency in Building" and "BCEA Membership Directory"



**BUILDING CONSTRUCTION EMPLOYERS' ASSOCIATION**  
of Chicago, Inc.  
(founded July 27, 1911)

228 N. LA SALLE ST. • CHICAGO 1 • STate 2-6152

BCEA ——— BCEA ——— BCEA ——— BCEA



## Cost of Research — 5 Per Cent

The average American company dependent upon technological developments should spend about 5 per cent of its sales for research if it is to keep up with competition, a noted research director said in Worcester, Mass., on Dec. 10.

The opinion was expressed by Dr. Halden A. Leedy, director of Armour Research Foundation of Illinois Institute of Technology, Chicago, at an industry conference at Worcester Polytechnic Institute.

Speaking on "How New England Companies Can Take Advantage of Technological Developments," Leedy said it is difficult to give a generalized answer on how much money a company should spend on research and development.

He stated that the average U.S. company spends only about 1 per cent of its sales for research, with expenditures ranging from less than 1/2 per cent in the non-technical industries to 9 per cent in the more scientific industries.

He stated, however, that "an expenditure of about 5 per cent probably is necessary to keep up with competition in any industry whose products and processes are rapidly changing as a result of new technological developments."

Few companies, large or small, can long survive without some form of research, he asserted.

Research is insurance for tomorrow, Leedy declared, pointing out that those companies that neglect it may find themselves left behind in the competitive race for larger markets and higher profits.

More than 50 per cent of all products currently being manufactured can be traced directly to results emanating from some research laboratory, the research director stated.

"And it would be my guess," he added, "that most of the remaining items either have been improved or require less man-hours to produce as a result of research and development."

In the last 20 years, Leedy said, research has fathered entire new industries, including magnetic recording and the whole electronics industry, which has grown to a \$6 billion a year business.

"In my opinion," he asserted, "there is no question but that a company must use the latest technological advances ap-

plicable to that industry if it is to survive and grow in the present technological age."

Leedy pointed out that the economy of the United States in the last two decades has grown from a gross national product of \$83 billion to a little more than \$400 billion today, and has brought the highest standard of living ever achieved by man.

"Most economists who have studied this problem," Leedy said, "agree that one of the most important and dynamic reasons for our economic growth is the unprecedented rise of organized research and development."

In the last two decades, the scientist stated, our annual research and development expenditures have grown from \$175 million to more than \$5 billion.

"It is even more startling to observe that in the last five years this nation has spent as many dollars for research and development as in all of its previous history," Leedy asserted.

"Today's fast moving industrial world makes it imperative for every company—regardless of size—to keep an eye on the results of research and development," the speaker said, adding:

"A few months' advantage frequently can make the difference between success and failure."

Leedy said medium-sized and small companies need not by-pass research simply because they cannot afford to establish their own research laboratories.

He pointed out that even the large companies utilize consultants, trade associations, universities, and research organizations.

By calling upon research organizations, Leedy said, a small company makes available to itself—at relatively little cost—a highly skilled and well-equipped staff covering virtually all fields of science and technology.

Leedy explained how research is conducted at Armour Research Foundation and cited several examples of how medium-sized and small companies benefited from research through such a procedure.

"Research and development facilities exist in the United States for all companies," he concluded, "regardless of the size and their research budgets."

"This situation is unique and is a major reason for the position of unparalleled industrial leadership of our country among the nations of the world."

Architecture is frozen music.

— Madam de Staël

(Architecture is) The poetry of bricks and mortar.

— Horace Greeley

with the  
**MURRAYS**  
its a  
Precision Setup



● If you have a "painting" project and want that satisfying assurance that you will get the most value over the longest period of time, then you should consider the MURRAY BROTHERS and get our recommendations and estimate.

Our Pride in an enviable reputation is your guarantee of the best

Industrial Painting Contractors since 1924

**MURRAY BROTHERS**

2438 ARTHINGTON STREET  
Chicago 12, Ill., CH. 3-1800



## All Navy Ships May Be Atomic

All naval vessels and some types of commercial ships built after about 1960 probably will be nuclear powered.

This prediction was made in Chicago on Oct. 18 at the 12th annual National Conference on Industrial Hydraulics by Stuart McClain, associate director of Argonne National Laboratory, Lemont, Ill.

Speaking on "Reactors of the Future" at the opening general session of a two-day conference at the Hotel Sherman, McClain discussed trends in both stationary and mobile reactors.

The conference is sponsored annually by Illinois Institute of Technology and its affiliate, Armour Research Foundation, in cooperation with 10 engineering societies and more than 100 industrial organizations.

The AEC official limited his predictions of military usage of mobile reactors to naval vessels.

Concerning military aircraft, he said there is an extensive research development program under way, but "no predictions of the extent of nuclear reactors for propelling military aircraft can be given."

On the use of reactors to drive commercial vehicles, McClain said "there appear to be definite trends at present," adding:

"The use of reactors to power loco-

motives does not appear to be practical because of the hazards involved. Nor does it appear practical to propel commercial aircraft by nuclear power because of the hazards.

"However, it does appear very practical to propel commercial ships by reactors in the near future."

Early this week President Eisenhower announced plans for an early start on construction of the nation's first atomic powered merchant ship, expected to be the forerunner of atomic merchant and passenger fleets.

McClain said nuclear plants appear to be economical only for ships that have low turn-around times, such as tankers.

He said it is probable that very large tankers built after 1960 will be nuclear powered, with the use of reactors in other types of commercial ships coming at a slower rate.

"One use for tankers that may occur in the not too far distant future is the transportation of fresh water," he stated.

"Such a use could result in a tremendous increase in the number and size of tankers."

He cited higher speeds and higher payloads as principal advantages of nuclear powered ships.

McClain reviewed the need to expand electrical power generation, and esti-

mated that in 2050 the world requirements of coal for the electrical load only would be equal to approximately 1,000 times the present coal production in the United States.

He predicted that by 1965 examples of several basic types of reactors will have been built and operated long enough to obtain realistic construction and operational costs, and that "one or more reactor types will have been demonstrated to compete economically with fossil fuel fired power plants in the United States."

By 1970, McClain added, new plants will be largely nuclear powered, and by 1980, atomic fueled plants will produce "an appreciable portion of the world's energy."

He noted that construction of several power reactors has been authorized in England, Latin America, and the Philippines, and that Russia "is pushing ahead with a sizeable nuclear program."

## Toll Contract Awarded

A contract with Lankton-Ziegele-Terry & Associates, architects-engineers of Peoria, Ill., in the amount of \$314,000 for the design and construction supervision of the Central Administration building, a central shop, and eight maintenance structures was authorized Jan. 11 by the Illinois State Toll Highway Commission.

Construction costs of the ten buildings are estimated to total \$3,708,000. The administration building, heart of the commission's tollway operations, and the central shop will be located on a 15-acre plot just north of the East-West tollway between Hinsdale and Elmhurst in DuPage county.

The area will be bounded generally by the tollway on the south, Cermak road (Illinois route 55) on the north, Illinois route 83 on the east, and Mid-west road on the west.

The central administration building will be headquarters for commission administrative personnel, tollway police, communications, toll collection auditing and accounting, purchasing, etc.

The central shop will be headquarters for all repairs to vehicles and operating equipment. The eight district maintenance buildings will each serve a tollway section approximately 25 miles in length. In many cases these buildings will be situated adjacent to toll plazas.

## Contracting & Material Company

*Engineers and Contractors*



1235 Dodge Ave., Evanston, Ill.

ROgers Park 4-1295

GRGreenleaf 5-6960



## a good advertising ▼ medium

FOR ALERT ADVERTISERS

### Midwest Engineer

*because . . .*

- ▼ Circulation in America's industrial and residential heart.
- ▼ The direct path to specifying, purchasing, and industrial executives—those who say yes.
- ▼ Provides coverage in all engineered industries.
- ▼ Opens a live market area for machinery, fabricated products, industrial equipment, materials of construction, parts, tools, products and services.
- ▼ The mirror of the coordination of engineering and civic interests.
- ▼ Advertising rates are extremely low for coverage of this big market.

## Western Society of Engineers

84 E. Randolph Street  
Chicago 1, Illinois

## Atmosphere May Reduce Jet Noise

The atmosphere itself may provide the most valuable and least expensive solution to the noise nuisance problem of jet aircraft flights.

Physicists at Armour Research Foundation of Illinois Institute of Technology, Chicago, are investigating the propagation of sound through the atmosphere and the effects of various weather conditions upon propagation.

Results of the study indicate that flights planned in accordance with weather conditions may lead to operating jets with reduced noise, according to Dr. Robert W. Benson, assistant manager of the ARF physics research department.

The investigation of sound propagation is being carried out for the Aero Medical Laboratory of the Wright Air Development Center, Air Research and Development Command.

Data collected in the study will be used to help the Air Force to locate airports in the future and to improve the

situation under which they now are operating.

The jet engine is the most powerful noise-maker known to man, according to Benson.

"Jet noise not only affects those who work in the immediate vicinity of the aircraft," he pointed out, "but also whole communities located anywhere near military airports."

Propagation of sound through the air long has been known to be dependent upon atmospheric conditions, Benson said.

An acoustics expert, Benson explained that since the noise problem is especially critical when aircraft either approach or leave the ground, it is extremely important to understand the characteristics of how sound is generated through the air at low level.

Complete facilities for studying propagation of sound have been set up by the Foundation at LaFox, Ill., 50 miles west of Chicago. The experimental installation resembles a miniature airport with ground-air radio facilities and an observation tower.

An actual plane is used as the noise source and is flown in a prescribed pattern above a recording microphone.

The plane is flown at various distances from the site to allow for a complete analysis of the noise characteristics as well as the amount of noise which reaches the ground, according to Benson.

The operator maintains constant contact, both visually and by radio, with the pilot in order to control his flight pattern. Instruments used to record noise picked up by the microphone also are controlled by the operator.

The installation contains various instruments necessary to make measurements describing weather conditions during the flight. Wind velocity, temperature, barometric pressure, humidity, and other atmospheric characteristics are recorded for each flight.

During the period of a year, more than 130 flights were made, Benson said, accumulating more than 250 hours of sound propagation data.

Measurements were made throughout the four seasons of the year under all types of weather conditions and at all hours of the day and night, he explained.

Experiments also will be conducted near Phoenix, Ariz., to gain information concerning the effects of weather conditions on sound propagation in the southwestern part of the United States.

Foundation scientists have learned to date that less noise gets to the ground in the summer than in winter, and that less noise is propagation if the plane flies in a certain direction of the wind.

The data collected also has enabled them to predict accurately the amount of noise arriving at the ground when prevailing weather conditions are known.

## Dutch Score Victory

In their constant struggle against the North Sea for more land, the Dutch scored another victory in September, 1956 when 200 more square miles of the Zuider Zee were blocked off. In time, 1,000 new farms will rise in the reclaimed area, *Engineering News-Record* says. Reclaimed land from the Zuider Zee represents about one-eighth of the total Netherlands.

**THE MONADNOCK**  
53 West Jackson Blvd.  
Chicago 4

LONG RECOGNIZED AS

*Headquarters  
for Office Space*

FOR  
Engineers  
Architects  
Patent Attorneys  
Manufacturers'  
Representatives



*A nationally-known business address*

## WM. E. SCHWEITZER & CO.

General Contractors

2207 Dodge Avenue

EVANSTON, ILLINOIS

AMbassador 2-3489

GRGreenleaf 5-4414



**Contractors for Industrial Construction**

## U.S. - Canada Affiliation Proposed

Dean Thorndike Saville of the New York University College of Engineering last year proposed "some form of official affiliation" between the two national councils representing 250,000 professional engineers in the United States and Canada.

They are the Engineers' Council for Professional Development (ECPD) and the Engineers' Joint Council (EJC). Dean Saville is retiring as president of ECPD. (In 1955 he was also president of EJC, the first man to hold both offices simultaneously.)

Speaking at the two-day 24th annual meeting of ECPD, the NYU educator pointed out that he was not proposing a complete merger of the two groups, but added: "The two organizations never worked together more cordially than in recent years, and the effectiveness and efficiency of both would be materially advanced if there was some form of official affiliation."

Dean Saville said there would be advantages "in simplifying the underwriting of both organizations, which now requires separate budgeting and separate contributions," and in a closer association of the secretarial staffs. Such affiliation, he observed, also would encourage more direct participation by the governing boards of professional engineering groups that comprise EJC and ECPD.

"The time seems propitious," the NYU dean said, "to move forward toward that increased and effective solidarity of the profession which can do so much for its individual members and join them in meeting their collective responsibilities for the welfare of mankind."

According to Dean Saville, the most outstanding instance of collaboration between EJC and ECPD in the last year was the work of a joint committee that has issued a report calling for the first comprehensive survey of the engineering profession. The report, now being circulated among constituent societies of the two councils, calls for a survey to cost about \$1,000,000.

The self-study, Dean Saville noted, stems from "critical problems confronting the profession." These, he said, "involve the education, utilization, and organization of engineers and social and

economic factors having important relations to the national welfare."

"The impact of the ever accelerating pace of scientific knowledge and discoveries as developed and made useful by the engineer has stimulated a revolution in society which is world wide and still in progress," Dean Saville continued. "The engineering profession has by force of events assumed broad responsibilities, among which its long established concern for individual technological competence is only one factor. Our profession is the most complex of any, as well as the largest numerically."

"The present shortage in engineering manpower has pointed up some of the problems confronting the profession, but discussions have raised more questions than have been answered."

ECPD is concerned primarily with the accreditation of programs in engineering colleges. It also administers programs in student guidance, professional education, training and recognition, engineering ethics, and dissemination of information.

EJC promotes cooperation among the various branches of the engineering profession and develops public policies on national and international affairs where services of members of the engineering profession are involved.

Constituent members of both councils are the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Society of Engineering Education, and American Institute of Chemical Engineers.

Additional ECPD members are the Engineering Institute of Canada, and the National Council of State Boards of Engineering Examiners. Additional EJC members are the American Water Works Association, Society of Naval Architects and Marine Engineers, American Society of Refrigerating Engineers, and American Society of Heating and Air Conditioning Engineers.

## Strengths of U.S. And Russia Compared

So much emphasis has been placed recently on the U.S.S.R. outpacing the U.S. in technical manpower that it's easy to overlook our own strengths, notes *Chemical Week*. For example, the U.S., with one fourth the land area and one sixth the population of Russia and its satellites, outproduces the Iron Curtain countries by nearly 100 per cent in steel, 380 per cent in petroleum, 300 per cent in aluminum, 150 per cent in electrical power.

## W. H. LYMAN CONSTRUCTION CO.

### General Contractors

134 N. LA SALLE • CHICAGO • STATE 2-8154



# Power Plant Thinks for Self

A completely automatic diesel power plant which thinks for itself, turns itself on and off, sends signals about operating conditions to technicians in a control center miles away and operates without manpower in attendance has been developed for use in U.S. radar systems.

Designed by Consolidated Diesel Electric Corporation, the equipment, Con Diesel's Model 4000, features an electric "brain" and built-in "Memory System." Delivery of the units is now being made to the Department of Defense, according to Con Diesel President Norman I. Schaffer.

The compactly-packaged primary power units are designed for gap-filler radar stations—which cover gaps between main and auxiliary radar installations because of uneven terrain and other reasons. The equipment powered by the Model 4000 provides a fence or alarm system between main and auxiliary stations.

Con Diesel holds an Air Force contract for about \$3 million to supply the completely automatic Model 4000 to four-fifths of all gap filler installations in the United States.

Because radar installations are designed to operate from commercial power supplies and lines where available, the power plants will stand in reserve or be used as a source of auxiliary power in regular operation. Normally, the power plant will include two diesel generator sets and a "brain" or power supply control. Each is completely automatic, designed to operate without personnel in attendance.

In the event the normal power supply from commercial lines fails, weakens, fluctuates or otherwise ceases to provide steady and sufficient power for radar operation, the automatic power plant turns itself on and provides power to the full load in less than 12 seconds.

The control point for the Model 4000 may be many miles distant from the actual installation. The units constantly, through associated equipment, relay operational information back to the central control point.

If, for example, one diesel generator set of the power plant ceases to operate at full capacity or fails because of insufficient lubricating oil—or any other

malfunction — the second unit automatically turns itself on and assumes the load.

At the same time, the inoperative unit returns itself to the standby position, turns itself off and relays back to the main control plant that it has failed and the reason for the failure.

The "Memory System" which records control or mechanical deficiencies or failures in the units, indicates to technicians at the control point what repairs are necessary and what parts need adjustment or replacement.

Other examples of automatic operation in Model 4000 include:

1. The unit disconnects the load from the commercial power supply before taking over. This serves as protection against damaging equipment or feeding power from the unit into commercial power lines.

2. When commercial power fails, both diesel generator sets of the power plant start simultaneously.

3. The first unit to reach full power output sends a signal to the second unit. The second unit then turns itself off and returns to standby condition to be ready to take over in case of failure.

4. As an extra precaution the power plant makes an automatic two-hour check of the commercial power supply voltage after this voltage has returned to the correct range. If the commercial voltage remains within established limits, the unit returns the radar equipment to commercial power, shuts itself off, and returns to standby condition.

Automation of the Model 4000 frees personnel and allows the radar line to

be operated with a minimum of trained technicians, at the same time decreasing the chance of human error.

Con Diesel's automatic power equipment in the continental radar system plays a large part in operations of SAGE, or the Semi-Automatic Ground Environment system. Here gap-filler stations will spot aircraft and feed the information into digital computers in which flight plan data has been recorded. Such operation will pinpoint the position of any aircraft aloft over the country at all times.

## National Electronics Conference to Meet

The 1957 National Electronics Conference — the 13th annual forum on electronic research, development, and application—will be held in Chicago on Oct. 7, 8 and 9, 1957.

The conference and exhibit, attended by nearly 10,000 scientists, engineers, educators, manufacturers, government officials, and students last year, will be held at the Hotel Sherman.

The University of Notre Dame has been accepted as a cooperating institution, bringing to eight the number of universities participating.

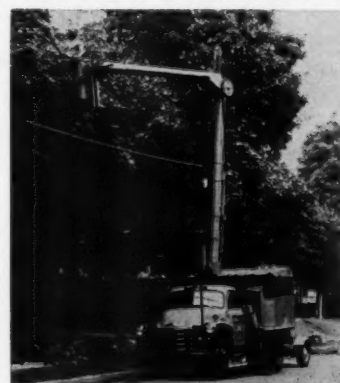
Sponsors of the conference are the Illinois Institute of Technology, American Institute of Electrical Engineers, Institute of Radio Engineers, and Northwestern and Illinois universities.

The cooperating institutions, in addition to Notre Dame, are Purdue, Michigan, and Wisconsin universities, Radio-Electronics-Television Manufacturers Association, and Society of Motion Picture and Television Engineers.

## ASPLUNDH Effective and Economical LINE CLEARANCE and Right-of-Way work

Opening of new rights-of-way, and trimming of trees and chemical brush control on existing rights-of-way are operations which should be entrusted only to specialists.

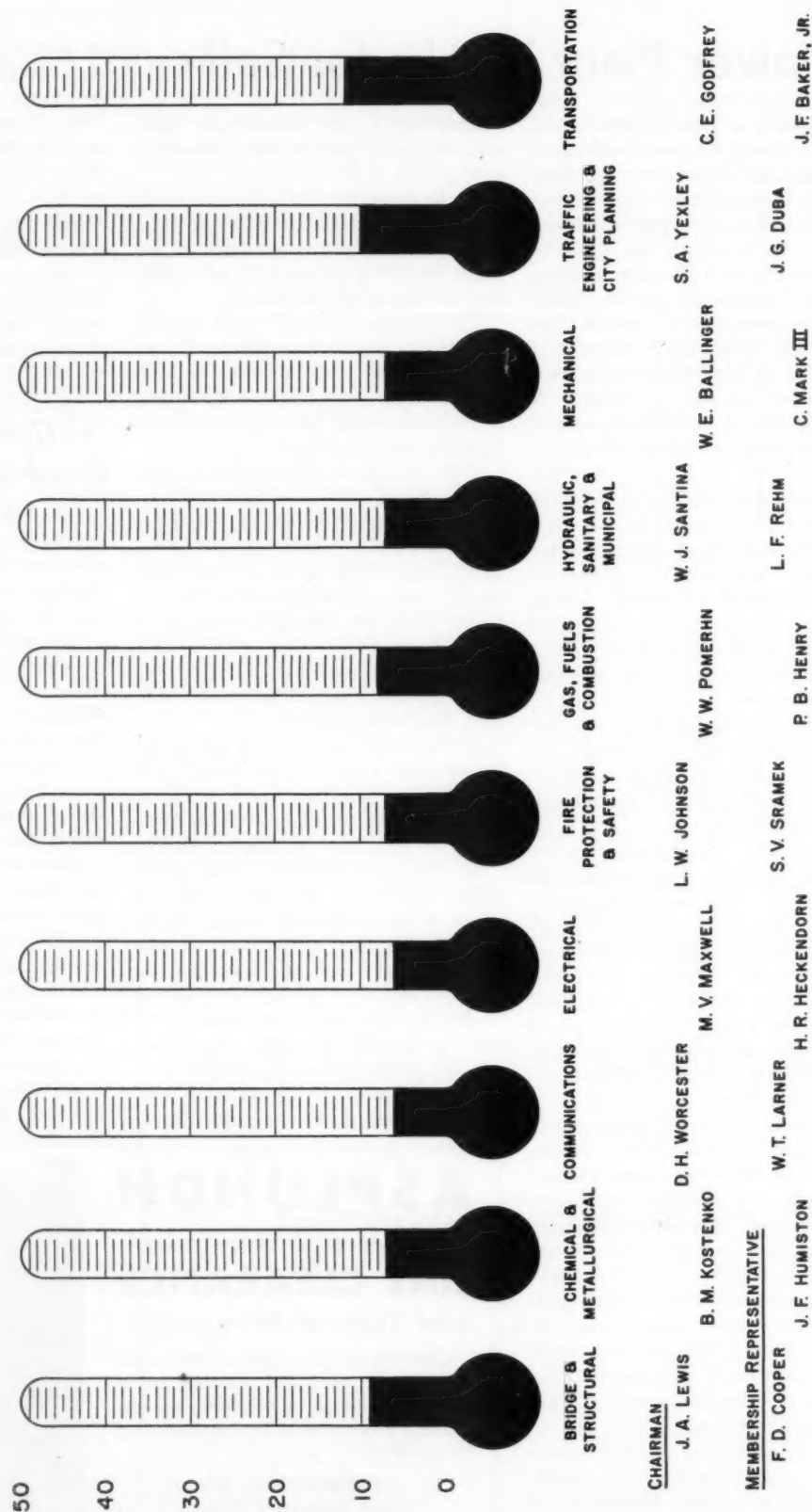
JENKINTOWN, PA.  
and Principal Cities





WESTERN SOCIETY OF ENGINEERS  
MEMBERSHIP DRIVE  
1956-1957

EXECUTIVE COMMITTEES - ENGINEERING SECTIONS



### Get Your Name on This List by Obtaining At Least One New Member

A. Allegretti  
E. A. Bagnard  
A. P. Boysen  
E. B. Buster (Three)  
J. M. Cole  
F. D. Cooper  
N. Dohrn  
L. A. Dondanville  
A. C. Dunn  
G. W. Duwel, Jr.  
D. W. Feters  
W. G. Fulton  
J. P. Gnaedinger (Two)  
C. T. Graves  
L. M. Guttsell  
C. Hayden  
G. M. Henry  
F. Heuchling  
K. C. Hudson  
G. L. Jackson (Two)  
C. A. Jaques (Two)  
H. W. Johnson  
J. Langan  
J. E. Linden  
F. H. Masters  
R. C. Meissner (Two)  
R. G. Michael

H. R. Miller  
H. S. Morgan  
F. Olearnik  
M. A. Powells, Jr.  
E. H. Pratscher  
S. R. Price, Jr.  
L. N. Rian  
J. P. Roche  
J. H. Rohlf (Two)  
W. B. Salzman  
J. W. Schaefer  
J. B. Schaub  
E. A. Schmidt (Two)  
F. M. Scott  
R. G. Scott  
R. V. Seaholm (Two)  
G. W. Serat  
F. V. Smith (Four)  
A. J. Snider  
M. Spiegel  
V. E. Staff  
R. O. Stauss  
D. A. Sullivan  
J. F. Sullivan III (Two)  
J. Umeda  
R. B. Wight  
B. Woloshin

The Society fiscal year is half over and the time has come for the big Spring PUSH of the Membership Drive.

**WHY DO WE HAVE MEMBERSHIP DRIVES?** I used to think that after our present headquarters were established the need for membership solicitation would be greatly reduced. It seems, however, that there are not many non-members who know of the advantages of belonging to WSE. It is necessary, therefore, that we have a Membership Committee each year to supervise the job of telling prospective members about the Society. The task cannot be limited to a Committee but every member of the Society should take the opportunity to mention WSE Membership to every available prospect.

We who are members believe in WSE and know that Membership is not a duplication of services or opportunities afforded by any other engineering society.

The Membership Committee needs your help. Will you please talk to some prospective member soon. Convince him of the advantages of belonging to WSE and above all, **SEND HIS NAME** to 84 East Randolph at your earliest convenience.

Sincerely,  
George L. Jackson

## Air Pollution

(Continued from Page 6)

I think the average layman always is amazed to learn from technical experts like those in this room that the whole field of knowledge on this subject is in a constant state of flux—that there is great need for more research and that the standards we set up today based on today's knowledge may be inadequate a few years from now. Tie an industry to these standards, and you create very little incentive to proceed beyond their achievement. On the other hand, a more flexible requirement may give an incentive to much greater effort which will far surpass present day standards. There are many people in industry who think that the finest type of ordinance is one that requires continuous research in air pollution, and also sets definite time intervals for reports on progress of that research.

Does this type of industry cooperation work in actual practice? I believe it does, and as an outstanding example, might mention Allegheny County, Pennsylvania. The drafters of the air pollution ordinance in that county realized that each industry had special problems, and so they called upon industries to set up their own committees to help draft the ordinance. In the case of Steel, this provided that a program be undertaken to determine practical methods of controlling emissions caused by the blast furnaces, open hearth furnaces and Bessemer converters. It also provided that reports indicating the status of the research be submitted annually to the bureau of smoke control. In addition, the ordinance permitted steel companies to participate in a joint program of research on these subjects and the result was the establishment of a joint committee representing several major steel producers to guide this research.

### Industry Self-Policing

Having called upon industry to help draft the ordinance, Allegheny County went a step further and asked industry to develop a voluntary self-policing program. Each plant has a smoke abatement coordinator to whom are reported infractions together with causes and corrective measures applied. A monthly summary of these infractions, if any, is compiled by each plant and transmitted

to a central point within the individual company. All infractions are tabulated on a final report form which also includes the causes, corrective action and what present or long range program is contemplated to minimize these infractions. This form is then signed by a company representative and submitted to the county director of smoke control.

What has it accomplished? Well, first of all, it has helped to make all operators of combustion facilities more aware of their responsibilities to perform their duties correctly and efficiently. Also, it quickly pinpoints for plant officials those operators who are laggard in their efforts in smoke abatement. Disciplinary action is applied if previous instructions and warnings have been disregarded.

From the standpoint of the community, Allegheny County's accomplishments have become world famous, and I might add, without burdening the community with large costs for research or inspection.

### Accomplishments

Industry is not only willing to cooperate in this way, but each individual company is already doing many things to help in air pollution control. Many such steps are completely voluntary, and far beyond the requirements of any existing law. Because I am most familiar with the steel industry and with our own company, I shall take the liberty now of dealing with some of the accomplishments of our plants in this and other communities, and some of the programs that they are carrying on. Many of these efforts go back a number of years.

For example, it was several years before Pearl Harbor that our engineers and operators at South Chicago began

to plan to dieselize the plant transportation system. The war emergency caused some delay, but in 1942, the first diesel was delivered replacing one of the old dinky engines. By 1952, the last old narrow-gauge steam unit was gone. Another outstanding accomplishment has been the improvement of gas cleaning equipment for blast furnaces. In addition, improved controls and other equipment have been added with each relining or rebuilding of old blast furnaces.

We have improved our raw material through sintering and beneficiation which reduce the amount of fines in the blast furnace charge. Sintering plants, too, have been improved by the addition of new dust-collecting equipment.

In the open hearths, we are constantly adding new combustion controls and in the power plants, we have installed better combustion controls and added smoke density recorders. We have removed the hand-fired boilers from some of our smaller buildings and now heat the buildings with plant steam.

Of course, when we build a new piece of equipment or a new plant, controls, precipitators and other equipment are included as part of the original installation. We think this is good operating practice, good public relations, and another instance of the industry's sincere desire to be a good neighbor and a good citizen.

Let me say quickly that none of these installations is perfect. Nor will they ever be the last word, for the operators and engineers with typical American ingenuity are constantly experimenting, constantly devising new equipment and new operating practices which are improvements on the old. The electrostatic

## The Haines Company

Ventilation & Air Conditioning Contractors

Sheet Metal Fabricators

— Welding —

1931 WEST LAKE STREET

CHICAGO 12, ILLINOIS

SE eley 3-2765

precipitators installed at our newest plant, Fairless Works in Morrisville, Pennsylvania, were the latest and best available when that plant went into operation on December 11, 1952. Already we are constructing others at other plants which it is hoped will better the performance of those at Fairless, good though that may be. In a sense, those at Fairless and those at other plants all are experimental, and the lessons learned in all of them will be applied as new facilities are installed in the future.

### Job Not Yet Done

We in the steel industry will be the first to agree that the job is not yet done and that much remains to be accomplished. That is why we are spending a great amount of time, money, and effort on research and testing of new methods and new equipment. It is also the reason why each new plant built or each new piece of equipment installed has some new features designed to aid in air pollution control. None of them, it may be noted, are required by existing ordinances. They are simply the continuation of a long-standing policy and operating practice of doing everything feasible to minimize air pollution.

Needless to say, United States Steel Corporation is not too unusual in this program. Other steel companies are doing their part, and as you learned from this morning's panel discussion, other industries are carrying on extensive programs of research and technological improvements aimed in this same direction.

In their work all of these companies have learned valuable lessons, lessons that they have shared with others through trade association groups, through organizations like MAPPA, and through civic committees set up in the various communities. This they conceive to be part of their responsibility.

### Community Responsibility

It seems to me that the community, too, has a responsibility. That responsibility includes the development of better means to control the great quantities of non-industrial pollutants in the air. It includes making the clean-up program a year-round activity, not simply a one week program each Spring.

And finally, it includes calling upon the best talents of each industry to work out effective means of improving performance in that industry.

I think there need be no fear that industry will not cooperate. In each town where it has been asked to help, it has done so and the program has usually been very effective. This, it seems to me, is the way to do the job. It's the cooperative, American way, and gentlemen, although the job is big, I think it can be done.

## Rettaliata Warns of Russian Supremacy

Russian supremacy over the United States in engineering manpower—long predicted as a result of lower engineering enrollments in American colleges and universities—is about to become a fact.

Such was a warning issued November 3 by Dr. John T. Rettaliata, MWSE, president of Illinois Institute of Technology at a dinner concluding the sixth annual Tool Engineering Conference.

"On the basis of available figures," he explained, "it appears certain that the Russians will overtake the United States in the number of engineers in a year or two."

Rettaliata based his statement on a National Science Foundation report comparing Russian and American scientific and technological manpower totals which showed that last year (1955) the U. S. margin had been reduced to approximately 40,000.

The report placed the 1955 totals for the two nations at 575,000 engineers for the United States, and 535,000 for the Soviet Union.

He noted further that in 1955 American colleges and universities graduated approximately 59,000 people in all science fields, of whom only 22,589 were in engineering, while Russian Institutions turned out 126,000 science graduates, including 59,000 engineers.

It was pointed out that basic differences in educational and statistical methods of the two countries does not permit entirely accurate comparisons.

In this connection, Rettaliata explained that the Russian total of 535,000 engineers excluded about 51,000 others classified as engineers by the Soviet Union.

The USSR also holds a wide lead over this country in the number of high school science and mathematics teachers, he stated.

Comparative totals, Rettaliata said, were 130,000 to 140,000 for the United States and 350,000 for the Russian secondary schools.

Comparison differences also were apparent in the figures for total science graduates in all fields, which showed 1,536,000 in the United States and 1,158,000 in Russia.

Psychologists, for example, are included in the U. S. figures for scientific personnel, but not in the Russian figures.

Rettaliata urged the Chicago and Illinois chapters of the American Society of Tool Engineers, which sponsored the conference, to intensify efforts to interest high school students with natural abilities for engineering careers in pursuing technological studies at the higher level.

"If the demand for more and finer engineers is to be met," he declared, "there is an urgent need for greater effort to reach into the high schools and bring engineering as a splendid career strongly to the attention of American youth."

He added that there is need of many more women engineers, for whom "there are attractive opportunities in many fields."

Rettaliata said there is an "acute" shortage of engineers in all fields, and emphasized growing needs in atomic energy, automation, and electronics fields.

Of the future of the engineering profession, he predicted:

"Engineering is entering an era of achievement that will dwarf prior accomplishments, great though they have been.

"Our rapidly rising population, the exploitation of new areas of scientific development, and the continuous necessity to maintain the technological supremacy of our national defense will find useful work for all the engineering talents we can muster."

## Taconite Use Grows

The increasing demand for taconite—a low grade iron ore used by the nation's steel mills—has prompted construction of a new port on the northern shore of Lake Superior, 80 miles from Duluth, Minn., reports *Engineering News-Record*. It will provide a shipping terminal for the \$300-million taconite process plant under construction at Hoyt Lakes, Minn.





# C.T.A. ROUTES SERVING THE W.S.E. BUILDING (84 E. RANDOLPH ST.)



## SURFACE ROUTES

**NORTHBOUND Daily**  
WILSON-MICHIGAN NO. 153

**NORTHBOUND Monday thru Saturday**  
STATE-WACKER NO. 149

**SOUTHBOUND Daily**  
ARCHER NO. 62  
STATE NO. 36A

**SOUTHBOUND Monday thru Saturday**  
MICHIGAN-STATE NO. 149  
JEFFERY EXPRESS NO. 5A  
(Rush hours only)

**SOUTHBOUND Monday thru Friday**  
WALLACE-RACINE NO. 44  
HYDE PARK EXPRESS NO. 2A  
(P.M. rush hours only)

**WESTBOUND**  
OGDEN-RANDOLPH NO. 58

WABASH

LAKE

MICHIGAN

STATION

RANDOLPH

SUBWAY STATION

ELEVATED

GARLAND

## RAPID TRANSIT ROUTES

**SUBWAYS Daily**  
NORTH-SOUTH  
To Howard, Jackson Pl., Englewood  
MILWAUKEE  
To Logan Square (250 ft. west via  
underground passage)

**ELEVATED Daily**  
DOUGLAS  
GARFIELD  
LAKE

**ELEVATED Monday thru Saturday**  
RAVENSWOOD

**ELEVATED Monday thru Friday**  
EVANSTON

**NORTH SHORE LINE**  
At elevated station

**SHOPPING DISTRICT NO. 142**  
(Monday thru Friday)  
To Northwestern (C&N.W.Ry.)  
and Union Depots (Burlington,  
G.M.O., Milwaukee and Penn-  
sylvania railroads)  
(Rush hours only)

**DIVERSEY NO. 76**  
**LINCOLN-WABASH NO. 11**  
To north and northwest side,  
WASHINGTON NO. 131  
(Monday thru Saturday)  
To Northwestern Station and  
west side via Randolph and  
Washington.

\* Shuttle bus, reduced rate for  
local ride, standard rate  
for transfer.

## COMPARE THESE TIMES

(from nearest "L" or Subway station)

- to 63rd & Halsted, only 21 minutes!
- to Howard Street, only 26 minutes!
- to Marion St., Oak Park, 27 minutes!

350-35211  
RFA



## Western Society Nominating Committee

To the Corporate Members:

I am pleased to announce that in accordance with Article X, Section 3, of the Constitution, the Board of Direction has appointed a Nominating Committee as follows:

A. P. Boysen (Board Member)  
R. G. Fencil  
George Krambles  
O. P. Luetscher, Jr.  
H. P. Sedwick  
H. H. Sonderegger  
Boris Woloshin

The Constitution also provides that suggestions for nominees shall be solicited in the publications of the Society.

**J. EARL HARRINGTON**  
Executive Secretary

### Tear off and Return

To the Nominating Committee:  
Western Society of Engineers:

I suggest the following names for consideration by your committee for offices indicated.

### Officers and Trustees

President .....  
1st Vice Pres. ....  
2nd Vice Pres. ....  
Treasurer .....  
Trustee (eight to be nominated)  
1. ....  
2. ....  
3. ....  
4. ....  
5. ....  
6. ....  
7. ....  
8. ....

### Members of Washington Award Commissions

Past Pres. of WSE. ....  
Member not a Past Pres.  
or at present a member  
or the Board or candidate thereof .....  
Signed .....  
Address .....  
Date .....

MIDWEST ENGINEER

## Space Instruments Described to AIEE

Some of the instruments that may be shot into space in the Vanguard Satellite were described in New York on Jan. 24 at a satellite symposium during the Winter General Meeting of the American Institute of Electrical Engineers in the Hotel Statler. The instruments, it was emphasized by Herbert Friedman of the U. S. Naval Research Laboratory, must be limited to two to three pounds to be acceptable for flight.

Friedman's paper, "Scientific Instrumentation in IGY Satellites," also detailed the type of information it is hoped will be obtained by use of satellites, including observation of solar flares, cosmic rays, measurement of the earth's magnetic field and meteorological data.

"The experiments which will be accepted for flight must meet the specifications of the Vanguard Satellite in which two to three pounds are available for the experiment, including detectors and their circuitry, telemetering modulator to feed Minitrack and power supply for these items," he said. "Of the groups which I have described, the environmental, Lyman alpha, meteorite and cosmic ray experiments appear capable of currently meeting the requirements."

While solar flare information has been gained by rockets, the sum total of this information, obtained above the obscuring layers of the earth's atmosphere, "adds up to less than an hour of useful observations," he said, adding that flares occur infrequently and at random and "a flare develops very rapidly, reaching a peak of the flash in a matter of five or ten minutes. To catch the spectrum of such short-lived phenomena is a tremendously difficult

task with conventional rocketry. A satellite offers the nearest approach to a continuous observing station above the atmosphere."

"The hydrogen Lyman alpha line at 1215.7A is the most prominent feature of the far ultraviolet solar spectrum . . . Since 'Sudden Ionospheric Disturbances' are directly associated with solar flares, Lyman alpha emission is expected to play a key role in such effects as radio fadeout.

"A satellite experiment can monitor the sun in Lyman alpha almost constantly and would be worth hundreds of randomly fired rockets for the same purpose. During the period of maximum solar activity in 1957 and 1958, the chances of observing a flare of Class 3 magnitude will be quite good and numerous smaller flares will certainly occur during a satellite lifetime."

Friedman also detailed some of the other problems in launching satellites, including inside and outside temperatures and the danger of damage to the satellite by meteors, meteorites and micro-meteorites.

As regards meteorology, Friedman said: "A satellite station far above the earth may ultimately provide detailed pictures of complete tropospheric weather systems covering areas as large as the entire United States. At the present stage of the art of satellite observations, however, the best that can be done is to devise simple photo-electric instruments to measure distribution of cloud cover."

Nature's Chief masterpiece is writing well. — Sheffield, Duke of Buckingham

## L. L. WELDY & ASSOCIATES

### Sorgel Electric Co.

Dry type Transformers      Saturable Reactors  
Air-cooled & Askarel Unit Substations

### Sprague Electric Co. — Power Factor Correction Capacitors

### Roller-Smith Corp. — Circuit Breakers & Switchgear

### Electric Distribution Products, Inc. — Plug-in & Feeder Uni-Bus

### Electrical Engineers Equipment Co. (Industrial representatives)

Load Break Switches      Isolators  
High Voltage Cubicles

4201 Irving Park Road

SPRING 7-8575

Chicago 41, Ill.

# Professional Directory

## JOHN F. PARMER

Engineers

Designing                      Structural System  
Consulting                    Industrial Bldgs.  
Investigations               Foundations  
Reports                        Pavement  
Supervision                  Bridges

173 W. Madison St.                      Chicago 2  
Franklin 2-4198

## GREELEY AND HANSEN ENGINEERS

Samuel A. Greeley    Kenneth V. Hill  
Paul E. Langdon      Samuel M. Clarke  
Thomas M. Niles      Paul Hansen (1920-1944)

Water Supply, Water Purification  
Sewerage, Sewage Treatment  
Flood Control, Drainage, Refuse Disposal  
220 S. STATE STREET, CHICAGO 4

## A. A. Lipsey & Associates ENGINEERS

Structural Design  
Industrial Buildings  
Commercial Buildings  
Foundations  
Investigation  
Reports — Appraisals

21 E. BELLEVUE      CHICAGO 11  
Whitehall 4-3298

## HAZELET & ERDAL

Consulting Engineers

Bridges — Foundations  
Expressways — Dams — Reports

Manadnock Block  
Chicago

403 Commerce Bldg., Louisville  
Dixie Terminal Bldg., Cincinnati  
Oding Bldg., Lansing

## STANLEY ENGINEERING COMPANY

Consulting Engineers

208 S. LaSalle Street                      Hershey Building  
Chicago 4, Illinois                          Muscatine, Iowa

## Alvord, Burdick & Howson

ENGINEERS FOR

Water Works, Water Purification, Flood Relief,  
Sewerage, Sewage Disposal, Drainage,  
Appraisals, Power Generation

20 N. Wacker Drive      Chicago 6

Telephone: Central 6-9147

## LESTER B. KNIGHT & ASSOCIATES, Inc.



- Management Engineering
- Industrial and Plant Engineering
- Construction Engineering

CHICAGO NEW YORK WASHINGTON, D. C.

## Batthey & Childs

ENGINEERS

231 So. LaSalle Street  
Chicago 4, Ill.

INDUSTRIAL PLANTS  
POWER PLANTS  
RAILROAD SHOPS & TERMINALS

DESIGN

SUPERVISION

## VERN E. ALDEN CO. Engineers

Design and Supervision  
of Construction

Industrial and Chemical Plants  
Steam Power Plants

33 North LaSalle St.  
Chicago 2

## KORNACKER & ASSOCIATES, INC. ENGINEERS

Bridges, Highways, Expressways and Railways,  
Building Structures, Industrial Plants, Super-  
vision, Foundations and Soils, Investigations  
and Reports, Sewerage and Sewage Disposal,  
Surveys.

53 West Jackson Blvd.  
Chicago 4, Illinois

Your Card\* on this or the opposite page will  
acquaint others with your specialized practice.

\*Restricted to Professional Architects and Engineers.

# Professional Directory

## SARGENT & LUNDY

ENGINEERS

140 S. DEARBORN STREET

CHICAGO, ILLINOIS

## DE LEUW, CATHER & COMPANY

CONSULTING ENGINEERS

Public Transit	Subways
Traffic & Parking	Railroad Facilities
Expressways	Industrial Plants
Grade Separations	Municipal Works
Urban Renewal	Port Development

150 North Wacker Drive, Chicago 6

San Francisco Toronto Oklahoma City

## SILAS CARTLAND P.E.

Consulting Engineer  
Designer

Air Conditioning,  
Mechanical & Electrical  
Systems for Buildings

911 Busse Hiway, Park Ridge

Ta 3-1300

## E. R. GRITSCHKE

and

## ASSOCIATES, Incorporated

Consulting Engineers

Designers of  
MECHANICAL and ELECTRICAL SYSTEMS  
for BUILDINGS

11 S. LaSalle St., Chicago 3, Ill.

## SOIL TESTING SERVICES, Inc.

Consulting Engineers

John P. Gnaedinger  
Carl A. Metz

Soil Investigations,  
Foundation Recommendations and Design,  
Laboratory Testing

3521 N. Cicero Avenue, Chicago 41, Illinois  
Milwaukee, Wisconsin - Portland, Michigan  
Kenilworth, N. J. - San Francisco, California  
Havana, Cuba

## JENKINS, MERCHANT & NANKIVIL

Consulting Engineers

Municipal Improvements	Sewerage
Power Development	Water Systems
Traffic Surveys	Industrial Plants
Flood Control	Recreational Facilities
Airports	Investigations and Reports

805 East Miller Street  
Springfield, Illinois

## ROBERT W. HUNT COMPANY ENGINEERS

Inspection • Tests  
Consultation

Engineering Materials

Cement • Concrete • Chemical  
Physical and Metallurgical  
Laboratories

175 W. Jackson Blvd., CHICAGO, And All Large Cities

## ESTABLISHED 1913 WALTER H. FLOOD & CO.

CHEMICAL ENGINEERS

Inspection and Testing  
Of Materials and Structures

Buildings, Roads, Streets, Airports

SUPERVISION OF CONSTRUCTION

CONCRETE CORE CUTTING

6102 S. BLACKSTONE AVE. CHICAGO 37

Branch—1332-4 N. Westnodge Ave.  
Kalamazoo 53, Mich.

**Your Card\* on this or the opposite page will  
acquaint others with your specialized practice.**

\* Restricted to Professional Architects and Engineers.

## Engineering Societies Personnel Service, Inc.

Est. 1918

Chicago  
84 E. Randolph St.,  
ST 2-2748

Detroit  
100 Farnsworth Ave.,  
TE 3-1090

New York  
8 W. 40th St.,  
WI 7-5878

San Francisco  
57 Post Street  
SU 1-5720

*The following items are furnished by the Engineering Societies Personnel Service, Inc., a non-profit, self supporting, personnel service sponsored by W.S.E., I.S.P.E., A.S.L.E., A.I.E.E., A.I.M.E., A.S.C.E., A.S.M.E., S.N.A.M.E., E.S.D., E.C.S.F. Replies should be addressed to the nearest office.*

*Members of the societies shown above*

*may publish a free advertisement on this page by registering at the nearest E.S.P.S. office. A weekly bulletin of Positions Open is available by subscription at \$3.50 a quarter for members and \$4.50 a quarter for non-members.*

*PLACEMENT FEES: The service is operated on a co-operative basis, whereby those actually placed in positions by*

*the Service pay a fee in accordance with the established placement fee rates, which is 4% of the annual salary to members and 5% of the annual salary to non-members. HOWEVER MANY EMPLOYERS EITHER PAY FULL PLACEMENT FEE OR NEGOTIATE FEES.*

### POSITIONS AVAILABLE

**C-5426 APPLICATION ENGR.** EE or ME age 25-45; 3+ yrs. in el. circuitry & Control panel layouts desired; know electro-magnetic & el. circuits. Duties: Application of indust. control devices to meet spec. customer requirements incl. solution of problems; will incl. water control system for auto. machines for a mfr. of el. controls sal. \$6500-8500 loc. Ill. empl. will pay the fee.

**C-5960 FIELD PROMOTER** Grad CE age to 35; 3+ yrs. in bldg. constr. or fire ins. work; know fire ins. ratings & bldg. codes des. Duties: Contacting fire ins. rating bureaus & state depts. to ascertain that new types of construction materials are being recognized by rating bureaus; will also do some contact among bldg. code writing authorities trav. 1/3 of time—eastern part of country for a trade assoc. in bldg. products field sal. \$75-8500 loc. Chgo. empl. will pay the fee.

**C-5961 INDUST. ENGR.** Grad. IE or ME age to 40; Duties: Staff position estab. product. order & inventory control systems, mfg. methods & incentive standards on high vol. product. basis for a mfr. of paper prod. sal. up to \$8,000 loc. Chgo. empl. will pay the fee.

**C-5967 DESIGNER ELECTRICAL** 2-3 yrs EE age 30 up; 3 yrs, exp. machine tool control circuit design, know relay circuits, motors; Duties: Process electrical eqpt. required for mach. devise circuits, order material, correspond with customer & vendor, check circuits, troubleshoot for a mfr. of presses sal. \$550-750 loc. Chgo. So. side empl. will pay the fee.

**C-5976 FACTORY & PRODUCT. MGR.** Grad. Mech. E. age abt. 35; 5+

yrs. in plant & product. engrg. on semi heavy eqpt. Duties: Take drawings & ideas & produce on product. basis semi hvy, eqpt. used in crop drying; unusual opportunity for a mfr. sal \$7-10,000 loc. Ill. empl will pay the fee.

**C-5978 CHIEF ENGR.** Grad. ME 5+ yrs. in light sheet metal fabrication & design; know tooling & mach. shop operation. Duties: Staff position reporting to V. Pres. of operations heading up entire dept. for mfr. of light sheet metal furniture & cases sal. \$8400-12,000 loc. So. Suburb of Chgo. empl. will pay the fee.

**C-5983 PLANT MGR.** Grad. Engr. age to 50; 5+ yrs. in steel fabrication. Duties: Complete charge of steel & iron fabricating plant-involving estimating, sales, detailing & production for a fabricator sal. \$10,000 loc. Chgo. empl. will pay the fee.

**C-5985 PRODUCT DES. & DEVEL. ENGR.** Grad. Mech. age to 45; 5+ yrs. in semi heavy eqpt. design & devel. Duties: Product devel. on plastering eqpt., water pumps, water drills & sound wave eqpt. abt. 75% devel., balance design & drftg. Able to follow product up to product. & make any necessary changes for a mfr. sal. \$8-10,000 loc. Chgo. empl. will pay the fee.

**C-5986 ASSOC. EDITOR BSEE** age 30-43; exp. in indust. electric dist., elec. maint. etc; know indust. elect. distrib., etc. Duties: Prepare articles, etc. for a publisher of magazines, some travel, car pref. sal. \$7-10,000 loc. Ill. empl. will negotiate the fee.

**C-6007 ENGRG. DRAFTSMAN** age 35-45; 5 yrs. working in field related to mfr. of illuminated indoor signs, knowl. of die design helpful. Duties:

Design & complete detailing of small illuminated signs-basically ornamental so any artistic abil. helpful; must be top notch draftsman staff position in small firm for a mfr. of signs sal. up to \$10,000 loc. Chgo. empl. will pay the fee.

**C-6008 PRODUCTION SUPT.** Some college background age 35-45; 10 yrs. exp. job shop-metal fabricating. Duties: Supt. getting work out, be resp. for meeting standards & gen. good function of highly specialized foundry; must be able to handle people for a foundry sal. \$10,000 loc. Chgo. empl. will pay the fee.

### ENGINEERS AVAILABLE

**786-MW: SALES ENGR.** 32; BSME 4 yrs. exp. in sales engrg. representing two mfrs. in petroleum, steel & general industry \$6500+ Chgo. Only.

**788-MW: RESEARCH & DEVEL.** (civil engrg.) 42 Ph D CE; 10 yrs. struct. & materials research; 2 yrs. in hvy. construction; 4 yrs. teaching & admin. in applied mechs. 4½ yrs. highway engrg; interested in directing research in bldg. materials or transportation field \$14,400 Midwest.

**791-MW: CHIEF STRUCT. ENGR. OR PARTNER** (any industry, or consulting or architectural engrg.) WSE 36 PhD-U. of Ill; desires chief struct. engr. or partner of firm; varied exp., excellent references \$12,500.

**792-MW: PLANT ENGR.** (metal working) 44 BSME: 14 yrs. in chge. of 9 plants—all plant expansion & constr. resp. for all mech. & elect. facilities; power plants, maint. of bldgs., millwrights, steamfitters & lubrication, air cond. machinery layout \$12,000 Chgo. Only.



## New Concept for House of Future

The house of the future, 10 to 15 years hence, will be built around a new concept—prefabricated service “cores.”

Jay Doblin, director of the Institute of Design at Illinois Institute of Technology, Chicago, presented his ideas on the house of 1966 to 1971 in an article in the October issue of *Popular Mechanics* magazine.

Featured in the article was a house Doblin designed to illustrate the use of such mechanical, or service core units.

“These cores are the mechanical centers around which every house is built,” Doblin said.

He pointed out that every house has the equivalent of a food or kitchen core, power core, bath core, entertainment core, and communications core.

At present most of these mechanical parts are laboriously and expensively assembled at the home site, according to Doblin.

“These cores should, and will, be available as complete units which can be installed easily at reasonable cost,” he said.

In Doblin’s house all ducts, conduit, plumbing, and the like would be placed in a trough around the house’s perimeter. The cores which carry all mechanical equipment would be plugged into the trough making an extremely simple mechanical setup.

Taking a close look at the mechanical cores themselves, the bath core would be put in place with only one electrical and one water connection. It devotes a small area to a sink, water closet, and storage.

The most luxurious section in the bath unit is the bathing and health center which has a reclining chair instead of a bath tub or vacant shower space. This section can be filled with water for a bath or used as a sit-down shower. In the ceiling are health lamps and oil sprays.

The design of the kitchen or food core is based on Doblin’s belief that present kitchen appliances are designed for an obsolete method of food preparation. He feels that preprocessed foods are gaining such acceptance that soon there will be little else on the market.

Doblin’s food core plan takes advantage of the fact that when a housewife

uses preprocessed foods the need for mixing, peeling, and blending is eliminated.

Doblin would contain all food, housewares, and appliances in the food core. The housewife could do all her work in a narrow band 18 inches deep and from 25 to 66 inches high.

Maximizing efficiency, the proposal provides for delivery men to load storage spaces and for maintenance men to repair power equipment from outside the house.

As planned by Doblin, the power core would require only water supply and electricity to keep the house in whatever atmosphere is desired by its occupants. It would contain a heat pump, ventilating equipment, an air purifier, and odor and germicidal control components.

The other mechanical cores in the house, for entertainment and communications, would integrate equipment for a variety of family activities. The entertainment center would afford facilities for home movies, television, radio, recorded music, and color slides.

Where more privacy is desired, the soundproof communications center would serve as a combination office-at-home and library. Here, all mail, business or personal records, communications equipment, and perhaps even a library stored on film, could be kept.

Doblin, a former executive designer with Raymond Loewy Associates, assumed leadership of the internationally known Institute of Design in 1955. He has served as chairman of the industrial design division of Brooklyn’s Pratt Institute.

## Pace Associates Get Toll Road Contracts

Contracts with Pace Associates, a Chicago firm of planners, architects and consulting engineers, for the architectural design and engineering services essential to the construction of toll plazas, a communications system, one “over-the-road” restaurant and ten service stations were authorized Jan. 11 by the Illinois State Toll Highway Commission.

The contracts, totaling \$1,022,000, consist of a fee of \$430,000 for toll plazas; \$48,000 for communications; and \$544,000 for the restaurant and 10 service stations to be built at five locations. Construction costs of the toll plazas, involving structures at 22 locations where tolls are to be collected, are estimated at \$5,741,000. The restaurant and ten service stations are estimated to cost \$7,210,000 to construct and the communications system, \$600,000. Total construction costs are \$13,551,000.

Charles L. Dearing, executive director, said that the communications system is to be based on micro-wave radio transmission with separate VHF channels for policing and maintenance. The system is to be compatible with and capable of being linked to the Indiana Toll Highway police as well as to Illinois state police districts 2, 3, and 4.

Dearing said the micro-wave system chosen offers the further possibility of being used for automatic transmission of toll collection data from toll plazas to the Central Administration Building. This would enable the commission to have financial reports of the previous day’s operation by noon each day.

### Engineer - Consultant

**Outstanding opportunity for Engineer with training and experience in Electric Power Utility Field, including Thermal Power Plant Operation and Design and General System Economics. State general qualifications, education and age. Small recent photograph desirable. Replies considered confidential.**

MIDDLE WEST SERVICE CO.

20 N. Wacker Drive

Chicago 6, Ill.

Attention: Engineering Dept.

# Reviews of Technical Books



## Electric Circuits

*Analysis of Electric Circuits*, by William H. Middendorf, John Wiley & Sons, New York 16, N.Y. 1956. 306 pages. Price \$6.00.

This is a thorough examination of steady state circuits. The book elaborates six basic laws and definitions established by the early experimenters, and as Professor Middendorf develops the latest and most general techniques, he stresses their dependence on the basic laws.

In addition to a chapter on communication circuits, many individual points set this text apart: its well-defined voltage notation, its use of new ASA definitions and symbols, the historical and economic setting of circuit analysis development, the inclusion of node method, and an exposition of the dependence of parameter values on the physical makeup of circuits. Middendorf also explains fully the meaning of equivalent circuits, and develops equations for instantaneous active and reactive power for equivalent series and parallel circuits.

The book is divided into three major sections. The first of these—Basic Circuit Analysis—covers circuit analysis, basic laws and definitions, types of voltage and current variations, notations, the algebra of complex numbers, impedance and admittance, circuit parameters, the calculation of power, application of current or voltage to a branch composed of a single parameter and parameters in series, application to parallel branches composed of parameters in series, equivalent series and parallel branches, locus diagrams, resonance phenomena, analysis of circuits containing more than one source of current or voltage, and magnetic field coupling. Part II—Extension of Basic Circuit Analysis—contains chapters on nonsinusoidal waves and network simplifications and theorems. In the final section, both polyphase and communication circuits are included.

Associate professor electrical engineering at the University of Cincinnati, the author is also a consultant to private industry, and an inventor of many electrical devices.

## Treatment

*Sewage Treatment*, by Karl Imhoff and Gordon Maskew Fair, John Wiley & Sons, New York 16, N. Y., 2nd edition, 1956. 338 pages. Price \$7.50.

This new book, rewritten from start to finish, is concerned with the requirements and practices of North American municipalities, habitations, and industries.

The second edition replaces discussions of obsolete treatments with those of new processes that have developed along predictable lines during the past decade. As the authors point out, greater operating efficiency is achieved by the conversion of intermittent operations into continuous ones, and by the replacement of shock loading with continuous uniform loading, or load distribution. The modern examples taken up by Imhoff and Fair include step aeration or dis-

tributed loading in the activated-sludge process, and continuous loading and sludge digesters with thickened sludge.

Chapter headings for this edition include: general considerations; composition of sewage; screening and skimming; sedimentation; chemical precipitation; elements of biological treatment; treatment on soil; trickling filtration; the activated-sludge process; chlorination; sewage sludge and digestion; sludge gas and its utilization; sludge treatment, disposal, and utilization; unsewered household wastes; water-borne industrial wastes; self-purification of receiving waters; and disposal of sewage in receiving waters. Easy arithmetical calculations are employed throughout, and a simple outline given for the general nature of the structures and mechanisms commonly used in sewage treatment. A serviceable working aid is similarly provided through the use of generalized values rather than via ponderous statistical tables giving the design and operating characteristics of existing plants.

Imhoff, a consulting engineer in Essen, Germany, lends to the volume his years of practical experience and invention. Dr. Fair is Abbett and James Lawrence professor of engineering and Gordon McKay professor of sanitary engineering at Harvard University.

## Propulsion Elements

*Rocket Propulsion Elements*, by George P. Sutton, John Wiley & Sons, New York 16, N.Y. 2nd edition, 1956. 483 pages. Price \$10.25.

Subtitled "An Introduction to the Engineering of Rockets" this is one of the very few technical books now available specifically on propulsion. The new edition, about 60 per cent larger, includes a much broader treatment of basic theory and a more thorough description of the physical mechanisms, applications, and designs of rocket propulsion systems.

The material falls into three main categories. The first consists of chapters on liquid propellant rockets, their working fluids, and their design. New chapters on solid propellant rocket fundamentals, working substances, and rocket design comprise the second category. The third and major part of the book covers general principles of thermo-dynamics, chemistry, heat transfer, flight theory, rocket history, and testing methods, all as they apply to both liquid and solid propellant rockets.

Choice of subject matter in tables, examples, problems, and charts has been dictated chiefly by practical considerations. All symbols and terminology have been made to agree with industrial and military standards. A bibliography of about 650 references is included as a guide to literature in rocketry and related fields.

Sutton's entire engineering career since his graduation from the California Institute of Technology has been in rocket work. The first edition of his book won the G. Edward Pendray Award of the American Rocket Society.

## Section Committees Make Nominations

The Nominating Committees of the following sections have nominated two members each as the regular ticket for directors of these sections, for a term of three years, beginning June 1, 1957:

Nominees for the Electrical Engineering Section are:

Philip J. McLaughlin,  
Field Engineer, Line Material Company.

Frank M. Scott,  
Supervisor, Utility Sales, Allis-Chalmers Manufacturing Co.

Nominees for the Transportation Engineering Section are:

Edwin C. Horn, Jr.,  
Staff Engineer, DeLeuw, Cather & Company.

Dwight E. Perrine,  
Assistant Chief Engineer, Chicago & Western Indiana Railroad and The Belt Railway Company of Chicago.

Other corporate members may be nominated by petition signed by ten corporate members of the Society, provided acceptance of these nominees has been secured in writing.

Directors of the Electrical Engineering Section will be elected at a meeting, Mar. 26, 1957.

Directors of the Transportation Engineering Section will be elected at a meeting, Feb. 26, 1957.

## Silicon Rectifier Use To Grow Widespread

Widespread use of silicon rectifiers in the electrical industry may be expected in the coming years according to Herbert W. Henkels of the Westinghouse Electric Corp., Youngwood, Pa.

Henkels made the prediction in a report presented at the American Institute of Electrical Engineers Fall General Meeting in the Morrison Hotel in Chicago.

Henkels reported that recent intensive efforts in the development of silicon materials and devices have already resulted in the introduction of practical silicon rectifiers in the electrical industry.

Complete rectifiers have been tested under all the environmental conditions required under the Mil-E-5272-A speci-

fication, said Henkels. Humidity, salt spray, vibration and temperature cycling tests have been held. No difficulty was expected or experienced in salt spray or humidity tests because of good encapsulation and the solution of cracked header problems, it was pointed out.

Henkels also reported that ageing tests have been in progress for over 15,000 hours.

Henkels cited the difficulties which have arisen in the application of silicon rectifiers. "One of the more serious of these is the correct rating of the rectifiers for circuits in which current surges are obtained. Other problems have arisen in the ageing of parts of the rectifiers. Such problems, as they have arisen, have been solved by careful process control and rating. It is expected that further difficulties will arise as the silicon rectifier is given wider and wider application. However, the physical and chemical stability of the correctly constructed and carefully encapsulated basic cell are such that the general successful application of the silicon rectifier may be looked for in the next few years."

## Hush-hush Device Guards Installations

Hush-hush device for guarding top-secret installations has been revealed as an electronic "fence" hidden by a conventional steel fence, says *Factory Management and Maintenance*. Wires that run between each fencepost create an electronic trap that sounds an alarm if an intruder approaches within three-to-eight feet—whether he's walking, crawling, or vaulting the fence.

## Personnel Shortage May Limit Missiles

The shortage of top technical people in science and engineering, and in particular, the shortage of top systems engineers, will be the eventual limiting factor in the speed with which guided missiles can be designed, according to Dr. Simon Ramo, executive vice president, The Ramo-Wooldridge Corporation, Los Angeles. He spoke in Toronto, Canada, on Nov. 26.

As the W. Rupert Turnbull lecturer, Dr. Ramo told the joint meeting of the Canadian Aeronautical Institute and American Institute of the Aeronautical Sciences in Toronto, Canada, November 26, that "Great as are the technical difficulties yet to be solved in propulsion, aerodynamics, electronics, chemistry, nuclear physics, and metallurgy, the problem of the integrating engineering of the ensemble is even more difficult."

Discussing "The Guided Missile as a System Engineering Problem," Dr. Ramo said, "It takes a top-grade scientist to apply the scientific method to engineering advances when the advance involves something that has never been done before, is only theoretically possible according to the laws of science, and when the number of technical fields involved in one single objective is so great, as is true of a guided missile system."

"It also takes practical engineering knowledge and experience, the ability to organize a complex operation, and the ability to make arrangements with people, government, and industry to do first-class systems engineering. The number of people that have these qualifications are extremely rare," he added.

## MUNCIE CONSTRUCTION CORP.

Contractors

for

Engineering

Construction

Substations

Transmission Lines

Distribution Systems

Utility Maintenance

201½ East Adams Street

Muncie, Indiana



## News of Engineers

Dr. Christopher E. Barthel Jr., assistant director of Armour Research Foundation of Illinois Institute of Technology, has been elected president of the National Electronics Conference for 1957.

Other officers named for the 1957 conference—to be held Oct. 7-9 at the Hotel Sherman in Chicago—are:

Chairman of the board, Howard H. Brauer, Bell and Howell Co.; executive vice president, Joseph H. Enenbach, Illinois Bell Telephone Co.; secretary, John S. Powers, Bell and Howell Co.; treasurer, Charles W. McMullen, Northwestern University; executive secretary, Gordon J. Argall, De Vry Technical Institute; legal advisor, Alois W. Graf, Graf, Nierman and Burmeister; and assistant treasurer, James H. Kogen, Askania Regulator Co.

The National Electronics Conference, the nation's leading forum on electronic research, development, and application, has been held annually in Chicago since 1945.

It is sponsored by the Illinois Institute of Technology, American Institute of Electrical Engineers, Institute of Radio Engineers, and Northwestern and Illinois universities, in cooperation with Notre Dame, Purdue, Michigan State, Michigan, and Wisconsin universities, Radio-Electronics-Television Manufacturers Association, and Society of Motion Picture and Television Engineers.

The Board of Directors of the American Society of Lubrication Engineers have announced the appointment of Cal-

vert L. Willey as administrative secretary for the Society.

Willey was formerly associated with the National Society of Professional Engineers as assistant to the executive director.

A business and public administration graduate of the University of Maryland, Willey served with the U. S. Navy for six years as a general line officer. Upon release to inactive duty in 1952 he assumed a position with a management consulting firm engaged in a naval personnel research contract for the Office of Naval Research, Department of the Navy.

Willey holds the rank of Lieutenant in the U. S. Naval Reserve.

The Auth Electric Company, Inc., Long Island City, New York, manufacturers of electrical signaling equipment and systems announced the appointment of three executives to newly created positions as part of an expanding sales promotion program.

J. Frederick Tuke, appointed sales manager of the Engineered Systems Division will direct the sale of signaling and communication systems for hospitals, schools, housing, industry, etc. Munro Radford, appointed sales manager of the Equipment Division will supervise sales of the company's extensive line of electrical signaling equipment to distributors and O.E.M. accounts. Both men have had considerable experience in their fields.

The third appointment is that of Sy Richman to the position of advertising manager. He formerly was a vice-president of the Lee-Stockman, Inc. advertising agency and will supervise advertising and public relations for both divisions.

A Design Award citation was given by *Progressive Architecture* magazine to Paul Rogers, MWSE, consulting engineer and fellow Member, in association with Hausner and Macsai, Architects, Chicago.

The Award Citation was presented in New Orleans, on Jan. 18, and represented recognition for the design of the Columbia and Pratt Apartments in Chi-

cago. This project consists of a 31 story apartment building, which was considered outstanding architecturally, and to have unusual features structurally.

This is not the first time that Rogers has been given an award. In 1953 he received the J. James R. Croes Medal of the American Society of Civil Engineers, and twice he has received awards from the Western Society of Engineers.

Five prominent members of professional distinction, including 3 past presidents, recently were honored when the Council of the American Society of Heating and Air-Conditioning Engineers conferred on them the grade of Fellow.

Included is Samuel R. Lewis, MWSE, partner in the firm of Sam R. Lewis & Associates, Chicago.

Society president John W. James, MWSE, is presenting the awards at the 63rd Annual Meeting, Feb. 25-28, at the Conrad Hilton hotel in Chicago.

It is the first time ASHAC has bestowed this honor. The grade of Fellow is conferred only on those who have made substantial contributions through educational, inventive, research or original work for the advancement of the arts and sciences of heating, ventilating, cooling, air conditioning and the allied arts and sciences.

A 50 Year member of the Society in 1955, Lewis was the founder and president of the first Society Chapter (Illinois) in 1911. He served as society president in 1914; became a Life Member in 1943, and was awarded the F. Paul Anderson Medal in 1950.

The initiator of advanced methods, Lewis has written a number of technical books and was a consultant to the Cleveland, Columbus, and Toledo boards of education.

He served on the Council, chairman of the Committee on Research, chairman Guide Publication Committee and also is a member of ASRE, National District Heating Association, and Chicago Association of Consulting Engineers, besides the Western Society of Engineers.

James E. Christiansen has just been promoted from traffic manager of Marquette Cement Manufacturing Company to general traffic manager of the same company.

### DON'T FORGET

When the public relations man or reporter contacts you about your new promotion or other good news, be sure to tell him you belong to WSE.



# New Era Begins in Timekeeping

A new era in timekeeping was ushered Jan. 3, 1957 with the introduction of the world's first electric wrist watch, perfected after ten years of research, development and testing by the Hamilton Watch Company of Lancaster, Pa.

No larger than a conventional wrist watch, the electric watch offers the highest accuracy and dependability ever achieved, and incorporates the first basic change in watch construction in almost five centuries, according to Arthur B. Sinkler, Hamilton president.

The watch is already available to consumers.

The radical structure of the electric watch completely eliminates the mainspring, an integral part of portable timekeeping devices since it was invented in 1480 by Peter Henlein of Nuernberg, Germany. The new watch is the only one in existence which runs without winding or without periodic agitation, Sinkler added.

"The watch movement," he pointed out, "is so exquisitely engineered that a tiny Energizer the size of a small shirt button will run it for a minimum of twelve months. In fact, Hamilton's electric watch would run for more than 20 years on energy that would operate a 100-watt bulb for no longer than one minute."

Sinkler called the electric watch a "milestone in Hamilton's program of research and expansion," and predicted it would in time completely replace present-day automatic watches.

"Instruments used in America today are becoming more and more complex," Sinkler said. "As a result, industry today is beginning to demand greater miniaturization of all types to continue its technical advancement. This demand for smaller instruments makes it important to combine and miniaturize mechanical, electrical and electronic mechanisms. Because of this a new technical revolution is in progress, and Hamilton's electric watch, with its miniaturized electric power plant and timekeeping assembly, is a major step in opening the frontiers of this new era."

"The electric watch," he added, "also has profound implications for our national defense, with miniature timing devices so vital to modern weapons of war."

Hamilton's Allied Products Division, which contributed significantly to the research and development of the new watch, fabricates and assembles mechanical and electro-mechanical precision mechanisms for instruments for the government and industry. Its assembly methods combine modern techniques of mass production with the ability to work to fine tolerances with miniature and subminiature parts.

The electric watch operates on chemical energy stored in a tiny Energizer, according to Dr. John Van Horn, director of research and development for Hamilton and its Allied Products Division. This energy is converted into electrical power as it releases a stream of electrons through a coil of fine wire fixed on a balance wheel. The electrical energy through interaction with permanent magnetic fields causes the balance wheel to oscillate. This oscillation is the mechanical energy which runs the watch.

Hamilton presently has more than 35 patents pending on this operation, he added.

"The over-all result is a precise miniature power plant built into the balance wheel, which in turn powers the gears and moves the hands of the watch. In the past, the balance wheel only controlled the power furnished by a mainspring. In the electric watch it furnishes its own power as well as controls it," Dr. Van Horn pointed out.

"The essential difference between our motor and the conventional electric motor is that the power plant, combined with a balance wheel, permits the flow of energy to be strictly controlled and the speed of the hands to be held to an accuracy of more than 99,995 per cent," Dr. Van Horn emphasized. "Combined with simplified construction and built-in shock resistance, the motor provides incredibly long life for the watch."

The coil is made of wire only one-fifth the thickness of human hair. Enough of this wire for 1000 watches would weigh only two ounces but would stretch from Dover all the way across the English Channel and well into France.

The tiny magnets used in the electrical system are of platinum alloy and have the highest energy content of any magnet in the world today. They were processed

by Hamilton expressly for use in the electric watch.

The Hamilton electric watch is more nearly free from disturbance by stray magnetic fields than any other watch, according to Dr. Van Horn. "The television service man, a physician with an electrocardiograph or any of the increasing number of people who work with or around magnets will be able to wear this watch with no interference," he stated.

Dr. Van Horn reported that Hamilton researchers and engineers worked closely with the National Carbon Company to develop a power unit which would release its energy in the most frugal fashion possible to accommodate the "fraction of flea-power" needed by the delicate mechanism.

The resulting gold-plated Energizer is designed for long life and low power. It is 400 times more efficient, in terms of space, than the mechanical energy stored in a mainspring, and does an incredible amount of work for its size, he pointed out.

"For example," said Dr. Van Horn, "in the course of one year it must open and close the circuit 75 million times. The second hand must be pushed forward 75 million times and the balance wheel must oscillate 150 million times."

The electric watch is more accurate and dependable and has about one-third fewer parts than the automatic watch which has gained great popularity in recent years, he added. "Tests show that the day-to-day accuracy of these new electric watches is far greater than that of automatic or manually-wound watches," he continued.

Before the electric watch, so-called automatic timepieces were dependent upon the wearer as part of the power system, Dr. Van Horn explained. Power was furnished by agitating the whole watch instead of turning the stem. Hamilton's electric watch is truly automatic—it does not have to be worn regularly or agitated at any time to function properly.

Also, he said, the electric watch is less complex than the old automatic because there is no winding mechanism or mainspring. The result is a simpler and more efficient operation.

The work of science is to substitute facts for appearances, and demonstrations for impressions.

— Ruskin



# WSE

# Applications

In accordance with the By-Laws of the Western Society of Engineers, the following names of applicants are being submitted to the Admissions committee for examination as to their qualifications for admission to membership into the Society in the various grades, i.e., Student, Associate, Member, Affiliate, etc.

All applicants must meet the highest standards of character and professionalism in order to qualify for admissions, and each member of the Society should be alert to his responsibility to assist the Admissions committee in establishing that these standards are met. Any member of the Society, therefore, who has information relative to the qualifications or fitness of any of the applicants listed below, should inform the Secretary's office. The Secretary's office is located at 84 East Randolph Street. The telephone number is RAndolph 6-1736.

- 68-56 Harry M. Betzig, Chief Engineer, Pollak & Skan, Inc., 4737 N. Ravenswood Av.
- 69-56 George F. Bowden, Engineer I, Commonwealth Edison Co., 72 W. Adams St.
- 70-56 James B. Saag, Traffic Engineer, DeLeuw, Cather & Co., 150 N. Wacker Dr.
- 71-56 Theodore F. Plimpton, Assist. to Vice Pres.-Steel Mfr., Inland Steel Co., 38 S. Dearborn St.
- 72-56 L. B. LeVesconte, Associate Elect. Engr., Sargent & Lundy, 140 S. Dearborn St.
- 73-56 Roy O. Nelson (Rein.), Owner, Roy O. Nelson Co., 330 S. Wells St.
- 74-56 Robert James Peterson, Principal; Suhr, Berryman, Peterson & Suhr, Inc., 130 N. Wells St.

## Standard Jet Fuel?

A standard jet fuel must be available throughout the U.S. and many other countries by 1960 if the oil company suppliers are to keep up with the continuing expansion in commercial aviation, asserts *Petroleum Processing*. A jet plane on a single flight from Los Angeles to Tokyo, with stops in New York, London and Rome, will have to be assured a uniform fuel whenever it refuels.

## ASHAE Symposia Slated for Feb. 25-28

The presentation of 13 papers and the discussions at 2 symposia will provide valuable technical information for those attending the 63rd Annual Meeting of the American Society of Heating and Air-Conditioning Engineers at the Conrad Hilton Hotel, Chicago, Feb. 25-28. Registration, sessions and most committee meetings will take place in the Conrad Hilton.

Simultaneously with the opening of the Annual Meeting the 13th International Heating and Air-Conditioning Exposition will take place in the International Amphitheatre under the auspices of ASHAE and the management of the International Exposition Company.

According to Society President John W. James, MWSE, it is expected that both the Annual Meeting and the Exposition will attract the largest attendance in the history of the Society.

## Automation Exposition

The first Military Automation Exposition will be held in New York's Trade Show building, March 18-21, scheduled simultaneously with the Institute of Radio Engineers (IRE) Show at the Coliseum.

Exhibitors at the Military Automation Exposition will be chiefly manufacturers and suppliers of components, subassemblies and manufacturing equipment used by the military or manufactured by prime contractors to military specifications. No classified (secret) items will be shown. Military Automation differs from Non-Military Automation in emphasis and in certain standards.

Nearly half of the equipment to be exhibited will be electronic at least in part. Instrumentation will be emphasized.

## Wanted: Leader With Technical Knowledge

Obtaining a leader with a high degree of technical knowledge and competence in the specialized field of electrical measurements, heads the list of the "most important considerations" in setting up an electrical standardizing laboratory. Francis B. Silbee of the National Bureau of Standards, Washington, D. C., made this suggestion in a paper presented Jan. 22 during the Winter General Meeting of the American Institute of Electrical Engineers in the Hotel Statler, in New York. The paper, "Suggested Practices for Electrical Standardizing Laboratories," was presented at a session on indicating and integrating instruments.

"A standardizing laboratory," explained Mr. Silbee, "is that segregated part of the complete organization, plant or shop that is charged with the duty of supplying calibration services at either the reference or the working-standard level, to the measuring apparatus used by the rest of the organization."

Silbee also listed the following as other important factors to be considered in operating a standardizing laboratory.

The measuring apparatus must be adequate and chosen specifically to fit the kinds of measurement and level of accuracy demanded.

The checking procedures must be definite and followed carefully, but should be flexible enough to meet emergencies.

The laboratory must accept responsibility for the internal consistency of its measurements and should look to a higher echelon (such as the National Bureau of Standards) only for its initial calibration and for periodic checks to detect drifts in the values of its reference standards.

## Gage Aids Blind

A newly-developed ultrasensitive electronic sound gage enables blind employees to check quickly and accurately the dimensions of precision parts for complex electronic components and equipment, *Electronics* reports. Blind workers learn to operate the gage with approximately five minutes' instruction.

## Argonne Reactor Generates Full Power

The Experimental Boiling Water Reactor (EBWR) located at the Atomic Energy Commission's Argonne National Laboratory, Lemont, Ill. generated electrical power at its full design rating of 5,000 kilowatts for the first time on Saturday, Dec. 29, 1956, in a test run.

This facility is the first to generate electricity from nuclear energy of the five reactor projects initiated in 1954 under the Commission's civilian power reactor development program.

Rated at 20,000 kilowatts of heat and 5,000 kilowatts of electricity, this experimental plant has been undergoing initial testing since construction was completed in November. Other significant events which occurred earlier in the month were the achievement of "criticality" on December 1, and the first generation of some electricity on Sunday, December 23, 1956.

The unique feature of this "Boiling Water Reactor" is that live steam is actually generated in the uranium core of the reactor by nuclear heat and is piped directly to a turbine.

The EBWR is an experimental plant and will be used by the Laboratory to further their studies of boiling reactors and evaluate their possibilities for large-scale application. It is planned that the Laboratory will use electric power as it is generated to meet a portion of its own power requirements.

The conceptual design of the reactor was developed by the Argonne National Laboratory which is operated for the Atomic Energy Commission by the University of Chicago. The Laboratory designed and fabricated the reactor core and provided technical supervision for the project. Sargent and Lundy of Chicago, are the Architect-Engineers for the power plant. The Summer Sollitt Company of Chicago is General Contractor for the project. The Graver Tank Company of East Chicago, Ind. constructed the large steel tank which houses the reactor and power plant. The pressure vessel was designed and fabricated by Babcock and Wilcox Company of Alliance, Ohio. The turbine and generator and related power plant equipment were designed and constructed by the Allis-Chalmers Company of Milwaukee, Wis.

## "Number, please?"

A German firm has developed a device which automatically makes telephone connections, reports *Product En-*

*gineering*. After a punched card with the desired number has been inserted into the accessory, dialing takes place automatically, and can be repeated, if the number is busy.

## Index of MIDWEST ENGINEER Advertisers

Vern E. Alden .....	22	Jenkins Merchant & Nankivil .....	23
Aldis & Company .....	13	Lester B. Knight .....	22
Alvord, Burdick & Howson .....	22	F. J. Kornacker & Associates .....	22
Asplundh Tree Experts .....	15	A. A. Lipsey & Associates .....	22
Batthey & Childs .....	22	W. H. Lyman Construction Co. ....	14
Building Contractors Employment Association .....	9	Middle West Service Co. ....	25
Silas Cartland .....	23	Muncie Construction Co. ....	27
Combustion Engineering .....	4	Murray Brothers .....	10
Commonwealth Edison Co. ...	Cover IV	Nash Brothers Construction Co. ....	7
Contracting & Material Co. ....	11	New Products Corp. ....	Cover II
De Leuw, Cather & Co. ....	23	John F. Parmer .....	22
Walter H. Flood .....	23	Sargent & Lundy .....	23
Greeley & Hansen .....	22	Wm. E. Schweitzer & Co. ....	13
E. R. Gritschke & Associates, Inc. ...	23	Soiltest, Inc. ....	5
The Haines Co. ....	18	Soil Testing Services .....	23
Hazelet & Erdal .....	22	Stanley Engineering Co. ....	22
Robert W. Hunt Co. ....	23	Valentine Clark Corp. ....	6
		L. L. Weldy & Associates .....	21

## Help the Society help you! Keep it posted on changes in your status

To make sure we have you listed correctly, if you change your status

**MAIL FORM TO THE WESTERN SOCIETY OF ENGINEERS**  
84 E. Randolph St., Chicago 1, Ill.

Name:.....  
Position:.....  
Firm:.....  
Firm Address:.....  
Home Address:.....  
Home Phone:..... Business Phone:.....



## Study May Solve A Runway Problem

Results of a two-year research study by Southwest Research Institute at San Antonio's International Airport may give an economical answer to repair of warping and cracking runways which were not built to withstand today's heavy aircraft loadings.

Studies by the independent nonprofit San Antonio research center for the city show that an experimental "pre-stressed" slab covering, developed at Southwest Research Institute, which can be laid over existing runways appears to be a sound way of strengthening the pavement and will also cut maintenance costs.

San Antonio Airport taxiways and runways are breaking up and conventional runways strong enough to withstand the load would require concrete twice as thick as the present ones.

Airport officials had two courses of action. One was to remove the old pavement and pour new concrete of increased strength to replace it. The other was to place overlays onto existing pavement to increase the load capacity to the required amount.

Southwest Research Institute scientists tested out both the conventional thick concrete overlays and a thin (four inch) prestressed concrete slab overlay on existing pavements. The tests were made on Taxiway No. 1, which gets the hardest wear at the airport.

The San Antonio City Council appropriated \$3,725 for engineering research at the airport. Steel companies donated prestressed wire. Texas Stress Concrete Corp. provided services without profit, as did Prestressing, Inc. Technical research was directed by M. M. Lemcoe, manager of structural research and development at Southwest Research Institute. Frank T. Drought, consulting engineer, represented the city in handling engineering contracts. Construction was by H. B. Zachry Co.

To avoid the expense of digging up the present runways and pouring new thick ones, Southwest Research engineers developed a thin prestressed slab which can be poured over the old runways to repair them.

"Although the prestressed overlays cost somewhat more at first," Lemcoe said, "we believe that the greatly in-

creased service life of the pavement and the lowered maintenance cost will more than offset the higher installation expense."

## Metal Cutting Study Started for ASTE

The most recent development in the long-range Metal Cutting Research Project of the American Society of Tool Engineers has just been announced by the ASTE Research Fund. A \$37,600 contract has been awarded to the Battelle Memorial Institute for a thorough and critical evaluation of the present knowledge of metal cutting.

The work will be carried on under the direction of Dr. F. W. Boulger, chief of Battelle's Division of Ferrous Metallurgy. Full advantage will be taken of Battelle's staff of chemists, physicists, metallurgists, mechanical and electrical engineers and specialists in applied mechanics and heat transfer, to provide an all-around team attack on the subject.

The subject of metal cutting is of great economic importance to every phase of industry. The estimated cost of the metal cutting process in the U.S.A. alone, totals \$10 billion yearly; 50 per cent of this staggering figure is wasted in the metal chips machined away.

The ASTE Metal Cutting Research Project has been set up to determine if a better understanding of the metal cutting process can be developed. *Proven* principles of metal cutting would result in better machine tools and cutting-tool materials, in cheaper methods for machining metals and, ultimately in reduced prices to the consumer of manufactured products.

The first step in the Metal Cutting Research Project was a contract with the John Crerar Library to bring the bibliography of the metal cutting literature up to date. As the second step toward this goal, Battelle will carefully evaluate this literature.

From this study a tentative outline of the metal cutting problem will be prepared. The outline will discuss the various theories of metal cutting and assign each to its proper place. Areas in which further research is needed will be indicated. The completed outline will be discussed with the most outstanding research workers and practical engineers in the metal cutting field. Based on these

discussions, Battelle will attempt to produce a final report carefully outlining all theories of metal cutting that this study has shown to be tenable.

To assist future workers in compiling valuable reports, suggestions will be made for reporting research results in the metal cutting field. It is also anticipated that the study may uncover some additional variables encountered in metal cutting that have never before been recognized.

The final contribution emerging from this phase of the project, will be detailed plan of future research required in the metal cutting field. This will be followed by the ASTE Research Fund Steering Committee as a basis for continuation of the Metal Cutting Research Project.

## Nuclear Congress To Meet Mar. 11-15

A 1957 Nuclear Congress, described as "possibly the most significant event of its kind ever held in this country" will be held at the Philadelphia Convention Hall March 11-15. The Congress is sponsored by more than 20 engineering and technical societies and will include a concentrated program of more than 200 technical papers, two days of Conferences for business executives interested in atomic energy, and an International Atomic Exposition where new developments related to peace time nuclear operations will be displayed.

More than 40 major topics will be considered at the Congress, including nuclear generating stations, reactors for ship propulsion, disposal of radioactive wastes, production of atomic fuels, legislative and legal problems, atomic energy developments abroad and practical, commercial applications for the atom in such fields as chemical production and food processing.

In revealing details of the program, Marshall said, "The tremendous scope of this Congress demonstrates the extent to which atomic energy is becoming a day-to-day industrial operation. Rapid growth and even more rapid change in the field have created a demand for a comprehensive program of this kind where specialists and industrial leaders can assemble and, in a short time, bring themselves up to date on new developments . . ."

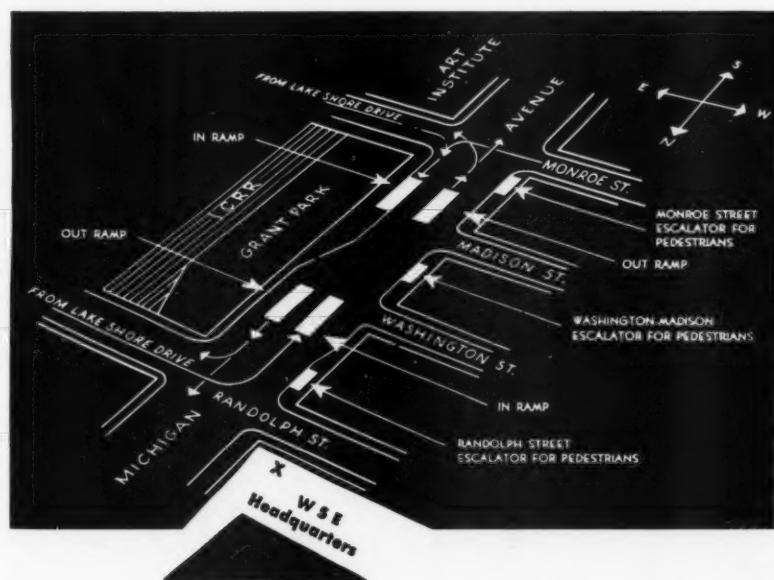


# SAY, ENGINEER!

## Do you like to DRIVE?

*Then why not drive to WSE meetings and other functions? There's plenty of PARKING almost at the door—the Underground Garage is diagonally across the street from WSE Headquarters (see the map below), two private garages are a block west, and the State-Wacker "Bird Cage" Garage is only a short distance away.*

Below: map showing Park Department Underground Garage



Interior view of Underground Garage

**If you're not driving it's still convenient to get to and from WSE meetings.**

Here are handy stations or stops:

- The Cab Stand is just across the street
- The Elevated is one block west
- The Subway is two blocks west
- Buses stop at the door or within a few blocks for every part of town
- The IC Suburban station is across the street
- Other suburban stations are conveniently served by bus or elevated.

**You see, your WSE Headquarters is at the handiest place in Chicago.**

**ENTER** at either Monroe or Randolph Street on Michigan

**EASY** access, Speedy exit

**ESCALATORS** convey you to street level

**CAPACITY** The garage with its 2359 parking spaces, is designed to prevent overcrowding.

## New 375,000 Volt D.C. Test Unit goes circuit riding for potential trouble spots on Edison System

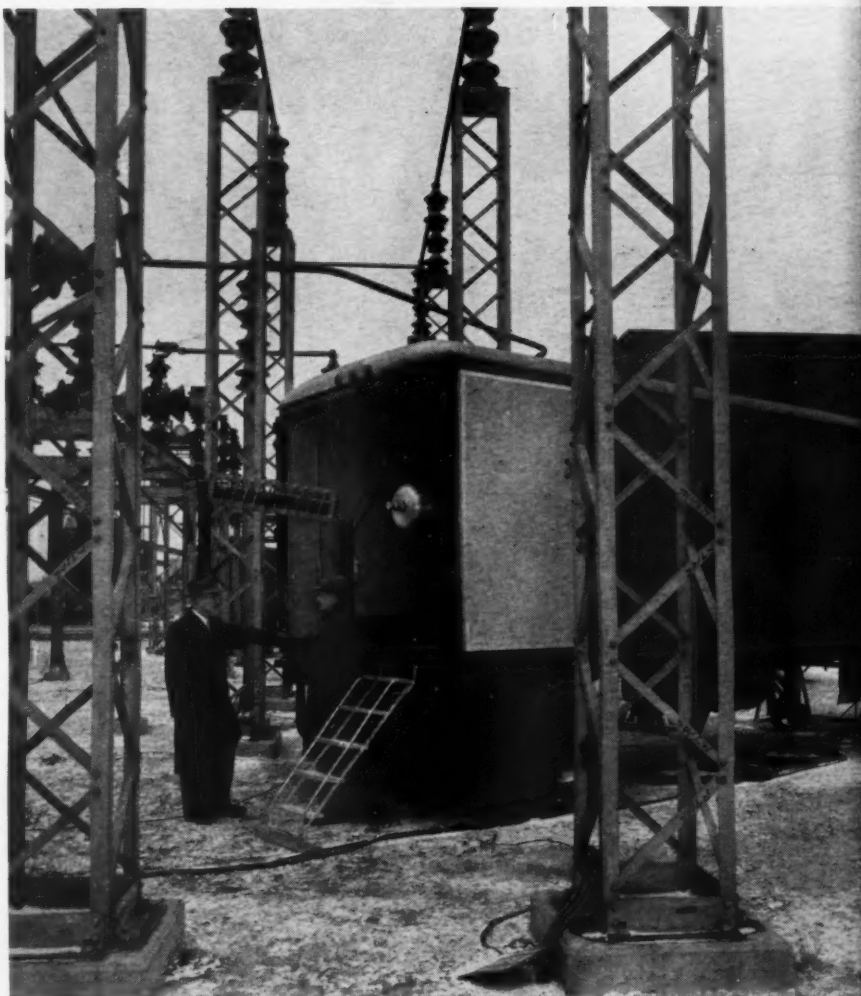
**Largest mobile unit in use by any utility, now reduces expensive permanent test installations to minimum**

In order to keep the cost of electric power to customers as low as possible, Edison engineers constantly stress the importance of doing the job in the most economical manner without sacrificing the safety of men or equipment, or the high quality of service.

For example, permanent installation of extra high voltage testing equipment in all of Edison's widely separated stations would add up to a costly investment item. To meet this problem, a large mobile test unit (375,000 volts D.C.) has been developed through recommendations of Edison engineers.

Since it is mobile, it can service all the far-flung high voltage installations of Commonwealth Edison and Public Service Company at but a fraction of the cost of similar permanently installed equipment. Above this, it will be able to service new stations as they develop, making the original investment even more of a bargain.

This is another example of how Edison engineers apply their knowledge and foresight to provide the most reliable service consistent with good operating economics for the 6 million people in Northern Illinois.



Supervising Engineer Lowell Diefenbach explains operating principles of test set to Engineer Jim Wear. Large trailer contains main

unit rated at 250,000 volts D.C. A smaller trailer has 125,000 volt unit which, when coupled to main unit, gives full 375,000 volts D.C.

Engineer Jim Wear at controls of unit inside trailer.



 **Commonwealth Edison**  
AND  
**Public Service Company**

*Pioneers in progress for over 69 years*

©C. E. Co.

or  
m

iller  
bled

. Co.